



Attorney Docket : 443-17

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE  
BOARD OF PATENT APPEALS AND INTERFERENCES**

Applicant(s): Yamanaka et al.

Examiner: Kruer, K.

Serial No.: 08/855,905

Group: Art Unit 1773

Filed: May 14, 1997

Docket: 443-17

For: SYNTHETIC PAPER MADE OF STRETCHED POLYPROPYLENE FILM

Dated: September 17, 2007

Mail Stop: Appeal Brief-Patents  
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P.O. Box 1450  
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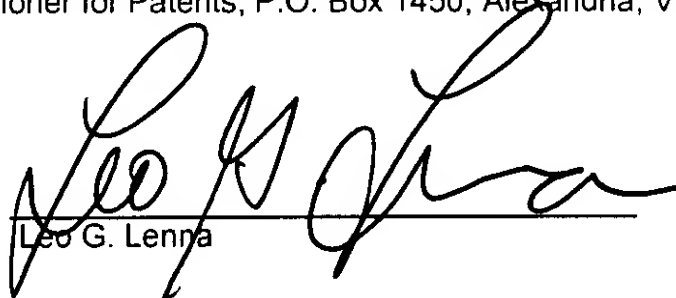
This Brief is being submitted in triplicate pursuant to 37 C.F.R. § 1.192. The Notice of Appeal was mailed on July 16, 2007.

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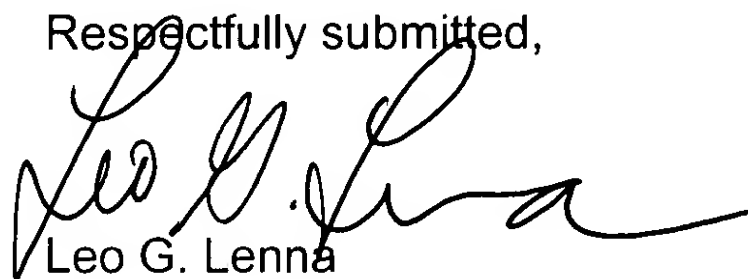
Dated: September 17, 2007

  
Leo G. Lenna

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Respectfully submitted,

A handwritten signature in black ink, appearing to read "Leo G. Lenna", written over the typed name.

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**REAL PARTY IN INTEREST**

The real parties in interest of this application are Oji-Yuka Synthetic Paper Co., Ltd. having an office at 3, Kandasurugadai 4-chome, Chiyoda-ku, Tokyo, Japan, and Sanyo Chemical Industries, Ltd., 11-1, Ikkyo Nomoto-cho, Higashiyama-ku, Kyoto-shi, Kyoto, Japan, the assignees of the subject application.

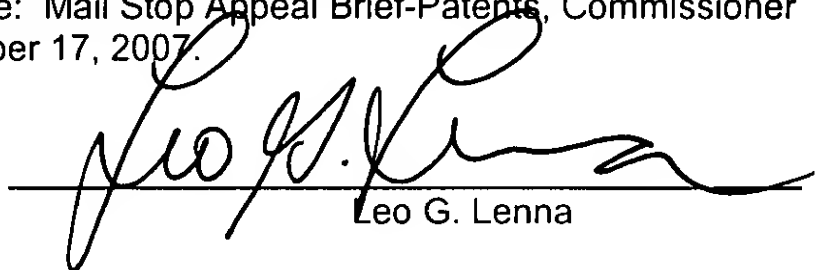
**RELATED APPEALS AND INTERFERENCES**

To the best of Appellants' knowledge and belief, there are no currently pending related appeals, interferences or judicial proceedings. However, Appeal No. 2005-2639 was filed on October 24, 2004 and a decision rendered by the Board of Patent Appeal and Interferences on December 16, 2005.

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Dated: September 17, 2007

  
Leo G. Lenna

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## **STATUS OF CLAIMS**

Claims 1-49, Claims 2-27 have been cancelled without prejudice. Claims 1 and 28-49, stand finally rejected and constitute the claims on appeal. A copy of the appealed claims is contained in the Claims Appendix.

## **STATUS OF AMENDMENTS**

In an amendment filed January 29, 2007, in response to an Office Action mailed September 8, 2006, no claims were amended. Thus, the Appendix to this Appeal Brief includes independent Claims 1, 28 and 29 along with dependent Claims 30-49.

## **SUMMARY OF CLAIMED SUBJECT MATTER**

The appealed claims are directed to synthetic paper made of stretched polypropylene resin film with excellent antistatic properties and offset printability (Claims 1 and 28-49).

As a result of intensive studies made by the present inventors, it has been found that stretching a resin film comprising, as a base material, resin components A, B, C, D and E as described below and oxidizing the stretched film by corona discharge treatment, plasma treatment, or the like, is effective in rapidly imparting antistatic properties to the film and also in improving printing ink adhesion thereon because the stretching and oxidation generate ultra fine cracks in the film matrix and a permanent antistatic agent incorporated into the film through kneading appears easily on the surface of the film. The claimed synthetic paper is based on this finding. Gloss is maintained in a range of 15-60% and opaqueness in a range of 83-96%.

The claimed synthetic paper having excellent printability includes a film obtained by oxidizing the surface of a film obtained by stretching a resin film comprising as the base material a resin composition consisting essentially of

100 parts by weight of resin components and from 10 to 250 parts by weight of component E: fine inorganic particles;

said resin components comprising, based on the total weight of the resin components;



55-90 wt% of component A: a polypropylene resin,  
5-40 wt% of component B: a polyetheresteramide containing aromatic rings  
which is derived from  
component b1: a polyamide having a number-average molecular weight of from  
200 to 5,000 and containing a carboxyl group at each end, and  
component b2: an alkylene oxide adduct of bisphenol having a number-average  
molecular weight of from 300 to 5,000,  
3-20 wt% of component C: a polyamide resin, and  
1-20 wt% of component D: at least one modified low-molecular weight  
polypropylene selected from the group consisting of  
component d1: an acid-modified low-molecular weight polypropylene having a  
number-average molecular weight of from 800 to 25,000 and an acid value of from 5 to  
150,  
component d2: a hydroxy-modified low-molecular weight polypropylene having  
a number-average molecular weight of from 800 to 25,000 and a hydroxyl value of from  
5 to 150, and  
component d3: an ester-modified low-molecular weight polypropylene  
obtained by partly or wholly esterifying component d1 with a polyoxyalkylene compound  
and having a number-average molecular weight of from 1,000 to 28,000 (page 5, line 1  
- page 6, line 19 of the specification).

The stretching is conducted at a temperature lower than the melting point of the  
polypropylene resin as component A (independent Claims 1, 28 and 29). Furthermore,  
the stretching and oxidation of the stretched film generating ultra fine cracks on a  
surface of the stretched film through which component B as permanent antistatic agent  
appears (independent Claims 1 and 28, page 4, lines 21-25 and page 21, lines 11-13 of  
the specification), while the paper possesses gloss of from 15 to 60% and opaqueness  
of from 83 to 96% (independent Claim 1 and Table 1 on page 37 of the specification).

The stretching of a film of a polypropylene resin comprising, as a base material,  
resin components A, B, C, D and E as described above orients polypropylene crystals  
in the polypropylene film matrix. Upon oxidation of the surface of the oriented film by  
corona discharge treatment, plasma treatment, or the like, the film develops ultra fine  
cracks on the surface thereof. This facilitates the appearance of the permanent

antistatic agent as component B on the film surface to not only rapidly impart antistatic properties to the film, but also improve printing ink adhesion thereon.

Support in the specification for claims 1, 28-49 can be found as follows:

Claim 1 (See page 4, line 13 to page 7, line 3 and original claims);

Claims 2-27 (Cancelled);

Claim 28 (See page 4, last line to page 6, line 9 and original claims);

Claim 29 (See page 4, line 3 to page 7, line 3, original claims, Examples & Table 1 & 2);

Claim 30 (See page 4, line to page 7, line 3 Examples & Tables 1 & 2);

Claim 31 (See page 21, lines 14-19);

Claim 32 (See page 23, lines 11-25);

Claim 33 (See page 23, lines 15-23);

Claim 34 (See page 23, lines 15-23);

Claim 35 (See page 10, lines 5-24);

Claim 36 (See page 8, lines 14 to page 10, line 14);

Claim 37 (See page 8, lines 14 to page 9, line 12);

Claim 38 (See page 14, line 15 to line 21);

Claim 39 (See page 14, line 15 to line 30);

Claim 40 (See page 15, line 3 to page 19, line 12);

Claim 41 (See page 16, line 1 page 14 to end);

Claim 42 (See page 17, line 10 to line 15);

Claim 43 (See page 18, lines 1 to 15);

Claim 44 (See page 19, line 13 to page 20, line 8);

Claim 45 (See page 4, line 3 to page 7, line 3, original claims, Examples & Tables 1 & 2);

Claim 46 (See page 22, line 23 to page 23, line 5; original claims);

Claim 47 (See page 22, line 23 to page 23, line 10; original claims);

Claim 48 (See page 22, line 23 to page 23, line 10; original claims); and

Claim 49 (See page 22, line 23 to page 23, line 10; original claims).

### **GROUND FOR REJECTION TO BE REVIEWED ON APPEAL**

Claims 1 and 28-49 stand rejected under 35 U.S.C. §103(a) as being obvious over U.S. Pat. No. 4,318,950 to Takashi et al. (hereinafter "Takashi et al.") and further in view of Ohba et al. (US 5,233,924) and European Pat. Pub. No. 0 613 919 A1 to Ueda et al. (hereinafter "Ueda et al.").

### **THE LEGAL STANDARD**

To reject claims in an application under 35 USC § 103, an Examiner must show an unrebutted *prima facie* case of obviousness. See *In re Deuel*, 34 USPQ2d 1210, 1214 (Fed. Cir. 1995). Obviousness must be based upon facts. *Ex parte Saceman*, 27 USPQ2d 1472, 1474 (BPAI 1993). When a conclusion of obviousness is not based on facts, it cannot stand. *Ex parte Porter*, 25 USPQ2d 1144, 1147 (BPAI 1992).

Suggestion and motivation must be based on "actual evidence" that must be "clear and particular." *In re Dembiczak*, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). "When the PTO asserts that there is an explicit or implicit teaching or suggestion in the prior art, it must indicate where such a teaching or suggestion appears in the references." *In re Rijckaert*, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (citing *In re Yates*, 211 USPQ 1149

(CCPA 1981)). “There must be some motivation, suggestion, or teaching of desirability of making the specific combination that was made by the applicant.” *In re Lee*, 61 USPQ2d 1430 (Fed. Cir. 2002) (citing *In re Fine*, 837 F.2d 1071,1075, 5 USPQ2d 1596, 1600 (Fed. Cir. 1998)) “Particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed.” *In re Kotzab*, 217 F. 3d 1365, 1371, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). When considering a reference or combination of references, the art, as a whole must be considered for all of its teachings. *In re Don Chemical*, 5USPQ2d 1529, 1531 (Fed. Cir. 1988); *In re Jezel*, 158 USPQ 98, 99-100 (CCPA 1968). The Examiner can satisfy the burden of showing obviousness of the combination “only by showing some objective teaching in the prior art of that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references.” *In re Fritch*, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992). Any deficiencies in the references cannot be remedied by conclusory statements. *In re Zurko*, 59 USPQ2d 1693, 1697 (Fed Cir. 2001).

These findings have recently be supported in the recent Supreme Court decision, *KSR Int’l Co. v. Teleflex, Inc.*, *Slip Opinion No 04-1350* (U.S. April 30, 2007). In this decision, the Court noted the importance in identifying “a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements” in the manner claimed. To facilitate review, this analysis should be made explicit. (*KSR, slip op. at 14*). Therefore, in maintaining a rejection under 35 U.S.C. §103 (a) based on the combination of references, it remains necessary for there to be

some suggestion and/or motivation why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed.

In the absence of a proper *prima facie* case of obviousness, an applicant who complies with the other statutory requirements is entitled to a patent. See *In re Oetiker*, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). On appeal to the Board, an applicant can overcome a rejection by showing insufficient evidence of *prima facie* obviousness. See *id.*

### **ARGUMENT**

(A) THE COMBINATION OF TAKASHI ET AL. WITH UEDA ET AL. AND OHBA ET AL. FAILS TO SUGGEST THE CLAIMED INVENTION AND ACCOMPANYING SYNERGISTIC ADVANTAGES TO ONE SKILLED IN THE ART.

The present invention is directed to an inventive synthetic paper that possesses not only excellent printability in offset printing or flexography but also excellent antistatic properties as well. Attaining these two properties has often been mutually exclusive. The present invention enables attainment of these two mutually exclusive goals by providing, either as the base material or surface layers upon the base material, the claimed polypropylene resin composition including fine inorganic particles and a film which is stretched and has a surface which is oxidized. The features of the presently claimed invention together with the accompanying advantages attained thereby, are not taught or suggested by the applied references, for the following reasons.

As noted at page 3, last paragraph of the final Office Action mailed March 15, 2007, the Examiner acknowledges that Takashi et al. does not teach the claimed antistatic composition capable of imparting antistatic properties. Instead, the Examiner relied on Ueda to provide this characteristics however, Ueda et al. adds nothing to the

teaching of Takashi et al. which would at all render obvious the invention claimed herein. More specifically, Ueda et al. does not disclose presence of a composition having antistatic properties in a stretched film, and further does not mention application of the resin composition to offset printing or flexography.

On the other hand, the present invention clearly provides a synthetic paper possessing excellent printability including excellent permanent antistatic properties and offset printability, as documented in the comparative testing outlined in the present application. More specifically, Comparative Examples 1 to 3 document that when a surface layer of a laminated paper composition does not contain the claimed antistatic resin, then ink adhesion property during offset printing is poor although surface resistivity might be good (Comparative Example 1). Alternatively, when the surface layer does not contain inorganic filler, then ink adhesion property at offset printing is poor although surface resistivity might be good (Comparative Example 2). Moreover, when the surface layer is not subjected to stretching then the surface resistivity, ink adhesion and suitability for paper feeding/discharge are all poor (Comparative Example 3). In contrast, the examples of the presently claimed inventive paper laminate exhibit both excellent permanent antistatic properties and offset printability.

In view of the above, it has clearly been documented that only the compositions having the claimed constitution herein will provide both excellent antistatic properties as well as excellent offset printability.

Ohba et al. disclose a synthetic paper having composition and structure remote to the present invention. Accordingly, Ohba et al. add nothing to Takashi et al. and/or Ueda et al. which would render obvious the invention as recited in any pending claim.

(B) IT IS NOT OBVIOUS TO USE THE POLYOLEFIN MATRIX FILLED WITH INORGANIC FILLER AND ANTISTATIC COMPOUND OF UEDA ET AL. IN THE PAPER OF TAKASHI ET AL.

In the final Office Action mailed March 15, 2007, it is stated that Takashi teaches a gloss of 60% or less and does not teach or suggest an opacity of 80%. Instead, Ohba is relied upon as teaching a synthetic paper comprising a polyolefin matrix filled with inorganic filler having opacity of 80% (abstract). The Examiner states that opacity of 80% is desirable "because such an opacity is sufficient for writing with a pencil."

Ueda et al. neither suggest that an antistatic effect-providing olefin resin composition can be oriented to form a film having enhanced antistatic effect nor disclose evaluation of offset printability of synthetic paper made from such antistatic effect-providing olefin composition. An essential feature of the present application involves orienting such an antistatic effect-providing olefin resin composition in admixture with a filler for the purpose of preparing synthetic paper. It had been found that the effect of orienting decreases surface resistivity of the resin composition from  $10^{14}$  to  $10^{11}$  ohm, even if the same high-molecular weight permanent antistatic agent is used, as shown in Comparative Examples 2 and 3 of the present application and documented in Table 2 on page 38 thereof. Thus, the surprising benefit of orienting on antistatic properties has been discovered for the very first time by the present invention.

Takashi et al. concern a synthetic paper obtained by laminating, on both sides of a base layer of biaxially oriented thermoplastic resin, a thermoplastic resin film obtained by uniaxially orienting a thermoplastic resin having an inorganic filler incorporated therein. Takashi et al. disclose incorporation of a low-molecular weight antistatic agent in the paper-like (surface) layer and base layer. However, the amount of the low-molecular weight agent incorporated is only from 0.1 to 1.0 parts by weight. In the

present invention, to the contrary, the amount of high-molecular weight permanent antistatic incorporated is as great as from 5 to 40% by weight based on the weight of the resin component.

As pointed out above, the present invention provides a film processing different constituent and structure from these references and thus provides effect quite different and unexpected from these references.

Furthermore, in making the rejection the Examiner has picked and choose only portions of the prior art necessary to make a case of obviousness. For example, the examiner points out that the rejection does not suggested that the entire composition of Ueda should be utilized. Rather, the rejection states that it would have been obvious to utilize the anti-static agent taught in Ueda in the composition taught in Takashi.

However, the Examiner is merely picking and choosing selected portions of each reference with no regard to even the slightest suggestion of combining these two references. The only suggestion to prepare the inventive paper is found in the present application itself, which cannot be used to fashion a prior art rejection in hindsight.

Therefore, it cannot be said to be obvious to use the polyolefin and antistatic compound of Ueda et al in the paper of Takashi et al.

(C) IT IS NOT OBVIOUS TO USE THE FILLER AND PROCESSING TAUGHT IN TAKASHI ET AL. WITH THE POLYMER AND ANTISTATIC COMPOUND TAUGHT IN UEDA ET AL.

Ueda et al. disclose an invention relating to a resin composition containing a polymeric antistatic agent (polyetheresteramide); injection molded articles (solid articles) having improved antistatic properties are disclosed in the examples. Ueda et al. reveal the following.



First, all the moldings disclosed are injection molded articles. There is no description therein concerning the technique according to the present invention in which a sheet formed by extrusion is further stretched to obtain a film. Since the moldings of the invention by Ueda et al. are solid articles (several millimeters) such as injection molded articles and are thicker than the stretched extrudate films according to the present invention (several tens to hundreds of micrometers), crystallization begins from the surface which cools rapidly. As a result, the surface of the molding becomes rich in the polyetheresteramide. Namely the polyamide incorporated in the polyolefin matrix undergoes surface orientation. In contrast, a feature of the present invention is by stretching an extrudate sheet, the polyetheresteramide is oriented in the film surface to provide an improved surface resistivity. This mechanism is completely different from the injection-molded articles of Ueda et al.

Secondly, the injection molded articles obtained by the invention by Ueda et al. contain no filler and do not have voids therein. Consequently, the molded articles obtained are transparent or translucent. Furthermore, although there is description in Ueda et al. that a filler as an example of resin additives may be added to the composition, no specific examples of filler kind are disclosed therein.

Furthermore, experimentation set forth in the enclosed second Supplemental Declaration executed by joint inventor Masaaki Yamanaka (to be discussed further under subheading (H) infra ), was also conducted wherein a film was attempted to be produced using a composition of Ueda et al. under the conditions of Takashi et al. (Experiment 5). The composition of Example 43 of Ueda et al., was selected as closest to the present invention.

As a result of the experimentation, biaxially stretched film could not be obtained because the sheet broke at a portion clipped by a chuck of the tenter stretching machine when stretched in the transverse direction. This is believed to be ascribable to the following reason; because polypropylene (PP) of grade suitable for injection molding has MFR of 9 g/min., high flowing property and low melting tension, when the polypropylene was stretched in the transverse direction with a chuck of the tenter stretching machine heated at a temperature of 160 degrees C or 160°C (a temperature around the melting point of PP), the sheet brakes and could not be stretched. The fusion bond of the sheet on the chuck was observed after the sheet was broken. Accordingly, it is clear that biaxially stretched film is difficult to produce from the composition of Ueda et al under the conditions of Takashi et al.

Therefore, it is not obvious to use the filler and processing taught in Takashi et al with the polymer and antistatic compound taught in Ueda et al.

(D) OHBA ET AL. ADDS NOTHING TO THE COMBINATION OF TAKASHI ET AL. AND UEDA ET AL. TO RENDER OBVIOUS THE CLAIMED INVENTION.

Ohba et al. disclose an invention relating to a synthetic paper comprising a polyolefin containing fine inorganic particles. There is description therein that the synthetic paper has an opacity of 80% or higher and excellent suitability for writing with a pencil. However, the object of Ohba et al. is to provide a polyolefin-based synthetic paper which does not curl upon infiltration of a printing ink solvent.

Specifically, the synthetic paper is one which is excellently suitable for writing with a pencil and in printability and which comprises a stretched polyolefin film layer containing from 8 to 65% by weight fine inorganic particles, a stretched ethylene/vinyl

alcohol copolymer film layer laminated to at least one side of the polyolefin film layer, and a coating layer formed on the outer side of at least one of the stretched ethylene/vinyl alcohol copolymer films.

The invention by Ohba et al. differs in layer constitution from the present invention. There is no description therein concerning improvement in suitability for paper feeding/discharge, a low surface resistivity, incorporation of a polymeric antistatic agent, or the like, which are subjects for offset printing to be accomplished by the present invention.

In conclusion, Ohba et al. cannot add to the combination of Takashi et. el. and Ueda et al. to render obvious the claimed invention.

(E) THE EVIDENCE PRESENTED IN THE COMPARATIVE TESTING FOUND IN THE PRESENT APPLICATION AND ACCOMPANYING DECLARATIONS EXECUTED BY JOINT INVENTOR MASAOKI YAMANAKA, DOCUMENTS IMPROVEMENT WITH THE CLAIMED INVENTION.

A total of five Declarations from joint inventor Masaaki Yamanaka, have been submitted in support of patentability and documenting the advantages provided by the claimed synthetic paper herein. The five Declarations, an initial and three Supplemental Declarations by Mr. Yamanaka, submitted with the first Appeal Brief filed and a fourth Supplemental Declaration was recently submitted with the filing of a RCE in a Supplemental Preliminary Amendment filed on August 11, 2006 clearly documents the unexpected, unobviousness of the present invention. The Declarations are respectfully enumerated as the Yamanaka I-V Declarations in the discussion that follows. In this regard, the following arguments (F)-(J) regarding these Declarations will be summarized to show that surprising, unobvious advantages of the claimed invention have indeed been documented.

(F) THE YAMANAKA I DECLARATION DOCUMENTS IMPROVEMENT OF THE CLAIMED INVENTION COMPARED TO THE COMPOSITION TAUGHT IN TAKASHI ET AL.

In the first Declaration executed by inventor Masaaki Yamanaka on Oct. 6, 1999 (Yamanaka I Declaration), a comparison of the inventive paper to one prepared according to Takashi et al showed clear improvement in antistatic properties possessed by the inventive paper over Takashi et al. However, this comparison was dismissed in the first Office Action mailed December 27, 1999 on the grounds, among other reasons, it would be obvious to increase levels of antistatic agent taught in Takashi et al to improve antistatic properties.

In this Yamanaka I Declaration, the invention by Takashi et al. in which a low molecular weight antistatic agent is incorporated, is followed up to evaluate the surface resistivity before and after water washing and offset printability. The results show that the synthetic paper containing a low molecular weight antistatic agent in a small amount as in the invention by Takashi et al. (0.3 parts; the same amount as in Experiment Example 2 of the reference) was improved slightly in antistatic property and had poor suitability for paper feeding/discharge in offset printing. On the other hand, when the low-molecular weight antistatic was incorporated in as large an amount as in the present invention (16.7 parts by weight based on the resin components, as in Example 1 of the present invention), then the rolls during film formation became tacky and film formation was hence difficult. Through water washing, the surface resistivity of the film obtained deteriorated considerably from  $10^{11}$  to  $10^{15}$  ohms because the antistatic agent present in the film surfaces dissolved away. Thus, antistatic properties were lost. The results further show that this film prepared according to Takashi et al. had poor suitability for paper feeding/discharge in offset printing.

Therefore, the Yamanaka I Declaration documents improvement of the claimed invention compared to a composition taught in Takashi et al.

(G) THE YAMANAKA II DECLARATION DOCUMENTS RELIABILITY OF COMPARATIVE EXAMPLES 2 AND 3 IN THE PRESENT APPLICATION

In the final Office Action mailed May 25, 2000 in the present application, the Examiner now relied upon Ueda et al as allegedly teaching the claimed antistatic composition utilized in the inventive paper and further, in paragraph 3 thereof, alleged there were too many variables in the comparative testing of the Yamanaka I Declaration, with the proper comparison being to a synthetic paper of Takashi et al having a different antistatic agent from the claimed polyetheresteramide (the top of page 7 of this action). In light of this rejection, a First Supplemental Declaration executed by joint inventor Masaaki Yamanaka on March 22, 2001 (Yamanaka II Declaration), documenting the comparative testing in Yamanaka I was carried out under identical conditions for all paper, was submitted. However, in the Office Action mailed April 30, 2001 in the present application, the Examiner maintained, in paragraph 3, the comparisons remain invalid because more than one variable is changed.

This first Supplemental Declaration shows follow-up experiments which were conducted based on the Examiner's opinion (expressed in the interview held in August 2000) that in order for the Comparative Examples 2 and 3 of the present specification to comparatively show the effect of stretching, they should be conducted with respect to films which have undergone the same surface treatment. The experiments demonstrate that the antistatic properties of the polymeric antistatic agent incorporated are greatly improved by stretching.

These results document that the surface resistivity and suitability for paper feeding/discharge of Comparative Examples 1 and 2 remained unchanged irrespective of whether the film had undergone a corona treatment or not; thus, the extrudate sheets obtained from the composition disclosed by Ueda et al. had insufficient antistatic properties. Namely, it has been demonstrated that stretching is essential for the effective development of antistatic properties.

(H) THE YAMANAKA III DECLARATION DOCUMENTS IMPROVEMENT OF THE CLAIMED INVENTION COMPARED TO TAKASHI ET AL.

In a second Supplemental Declaration executed July 12, 2002 by Masaaki Yamanaka in the present application (Yamanaka III Declaration), a comparison was conducted between Example 12 of Takashi et al. with both polyetheresteramide and other antistatic agent, against the inventive paper. The results in the Yamanaka III Declaration clearly document both improved antistatic properties and printability. However, the Yamanaka III Declaration has been attacked in the Office Action mailed January 27, 2003 on the grounds, among other reasons

[S]aid experiment does not agree in scope with the present claims [emphasis added] (Page 4, bottom)

However, it is respectfully pointed out this experiment recreates the composition of Takashi et al, and not the claimed paper; the test results presented in the Yamanaka III Declaration specifically prepare and ultimately compare paper according to the combination of Takashi et al with Ueda et al, as the Examiner has explicitly requested. More particularly, the Yamanaka III Declaration explicitly compares compositions prepared with

(a) the composition of Example 12 of Takashi et al with the antistatic agent and amount taught in Takashi et al (Experiment 1);

(b) an identical composition according to Takashi et al, except for substitution of a polyetheresteramide antistatic agent according to the present invention (Experiment 2); and

(c) an identical composition to (b) supra, except using the polyetheresteramide in a much larger amount of 20 parts by weight (Experiment 3), with a composition prepared according to the present invention (Experiment 4). As clearly documented, surface resistivity improved after washing with only the inventive composition (Experiment 4), with satisfactory printability only being attained with the inventive composition. Further, it was attempted to prepare a film comprising a composition taught in Ueda et al according the processing conditions of Takashi et al, in the Yamanaka III Declaration (Experiment 5). It has been documented impossible to prepare such a film in the Yamanaka III Declaration.

However, in the Office Action mailed January 27, 2003, the Examiner dismisses the Yamanaka III Declaration by first stating Takashi et al is relied on as teaching a biaxially-oriented polyolefin composition useful as paper with Ueda teaching the antistatic component (Ueda et al not being relied upon for teaching their entire composition), and then stating Ueda et al are not limited to molded compositions, i.e., their teachings. This is a total contradiction.

(I) THE YAMANAKA IV DECLARATION DOCUMENTS IMPROVEMENT OF THE CLAIMED INVENTION OVER ANY POSSIBLE COMBINATION OF TAKASHI ET AL. AND UEDA ET AL.

In a third Supplemental Declaration executed by inventor Masaaki Yamanaka on May 19, 2003 (Yamanaka IV Declaration), eight experiments were carried out preparing

different-layer films under a variety of conditions utilizing the composition prepared according to Example 12 of Takashi et al (Experiments 1-4), different-layer films prepared according to Example 1 in the present application (Experiments 5-7), and a three-layer film prepared according to Takashi et al but with a polyetheresteramide antistatic agent in large amount (Experiment 8). The results documented in the Yamanaka IV Declaration clearly indicate

(a) good resistivity and offset printability was only attained by paper prepared according to the claimed invention (Experiment 7), and

(b) a paper prepared according to Takashi et al and containing an antistatic agent of the type and amount of Ueda et al still failed to result in good resistivity and printability (Experiment 8).

In attacking the Yamanaka IV Declaration on page 5 of the July 11, 2003 Office Action, the Examiner states

[T]he second experiment is not representative of a paper rendered obvious by Takashi in view of Ueda. . . . Ueda teaches that b2 is necessarily present and components C, and D are desirably present. . . .

However, this is directly contrary to other assertions by the Examiner in this and previous Office Actions that Ueda et al are only relied upon for teaching the antistatic agent and not any other components. Then, when a composition according to Ueda et al was unsuccessfully prepared into a film in the Yamanaka III and IV Declarations, the Examiner simply dismisses this test result as “not representative of the prior art” [emphasis added] on page 6 of the July 11, 2003 Office Action.



Furthermore, on page 6 of the July 11, 2003 Office Action, the Examiner disagrees high molecular weight antistatic agent of Ueda et al. has been tested in the comparative compositions of the Yamanaka III and IV Declarations. Attention is again respectfully called to Production Example 1 on page 26 of the present application, where it is explicitly stated an ethylene oxide adduct of bisphenol A having a number average molecular weight of 1,000 is incorporated into the polyetheresteramide of the inventive paper. Incorporation of this component b2 is described in greater detail at page 10-12 of the present application. Polyetheresteramide B1 contains component b2; polyetheresteramide B2, prepared according to Production Example 2 on page 27 of the present application, also contains component b2. Accordingly, component b2 is clearly present in the antistatic agent component of the inventive paper.

(J) THE YAMANAKA V DECLARATION DOCUMENTS IMPROVEMENT OF THE CLAIMED INVENTION OVER ANY POSSIBLE COMBINATION OF TAKASHI ET AL. AND UEDA ET AL.

As indicated in the Preliminary Amendment submitted with the RCE filed on May 12, 2006, the Applicants have used the period of "suspension of action" to conduct several "side-by-side" comparison experiments. The experiments conducted compare the synthetic paper of the present invention with one of Takashi et al. as suggested by the Board in the Decision on Appeal dated December 15, 2005. The results are set forth in the fourth Supplemental Declaration describing the experiments of the "side-by-side" comparison and the results obtained from these experiments. A copy of the Declaration is submitted herewith.

As indicated in the IV Supplemental Declaration, Experiment 1 was conducted in the same manner as Example 12 of U.S. Patent No. 4,318, 950 (Takashi et al.).

Experiment 2 set forth in the accompanying Declaration was prepared in the same manner as in Experiment 1 of the accompanying Declaration, except PHOSPHANOL RL-20, a high-molecular weight antistatic agent was used instead of the low-molecular weight antistatic agent. The results are presented in tables 1 and 2 of the Declaration.

Experiment 3 of the Declaration was prepared in the same manner as Experiment 1 of the accompanying Declaration, except instead of the low molecular weight antistatic agent at 0.7 parts by weight, 20 parts by weight was used. In addition, after laminating the paper-like layer to the base layer, the low molecular weight antistatic agent was bled out of the paper-like layer and the surface tackiness was generated on the forming roll. The results are set forth in tables 1 and 2 of the Declaration.

Finally, Experiment 4 of the Declaration was prepared as in Example 1 of the present invention and the results are set forth in tables 1 and 2 of the Declaration submitted.

As can be seen from tables 1 and 2 in the Declaration, the surface resistivity of the synthetic paper containing 0.7 parts by weight of low molecular weight antistatic agent in Experiment 1 was  $2 \times 10^{13} \Omega$  before washing with water and  $1 \times 10^{16} \Omega$  after washing with water, indicating that the antistatic agent was washed out. Similarly, the low molecular weight antistatic agent on the surface of the synthetic paper of Experiment 3 was washed out with water resulting in a surface resistivity that remained unchanged. However, the high molecular antistatic agent of Experiment 2 was not washed out with water.

Finally, the surface resistivity in Experiment 4 also remained roughly the same before and after washing with water indicating that the amount of antistatic agent was not washed away.

In addition to surface resistivity of the synthetic paper, the Offset Printability of the paper was also evaluated. Evaluation of the Offset Printability (Ink Adhesion) of Experiments 1-4 of the Declaration indicates that unlike the synthetic paper produced accordingly to Experiments 1-3, the ink adhesion on the synthetic paper of Experiment 4 would not become practically problematic and there would not be a high frequency of paper feeding/discharge because of a high surface resistivity.

Therefore, based on the “side-by-side” comparison experiments performed and reported in the Declaration submitted herewith, the synthetic paper of Experiments 1-3 are practically unacceptable, where the synthetic paper of Experiment 4, which was produced according to Example 1 of the present application, is far superior and therefore, is practically acceptable for the market.

(K.) UEDA DOES NOT PROVIDE THE REQUISITE MOTIVATION TO USE THE SPECIFIC ANTISTATIC AGENT RECITED IN THE CLAIMS OF THE PRESENT INVENTION.

It is well settled in order to establish a *prima facie* case of obviousness, it is necessary for the Examiner to present evidence preferably in the form of some teaching, suggestion, incentive or inference in the applied prior art that one having ordinary skill in the art “*would have been led*” to do what the Applicants have done. See *Ex parte Levengood*, 28 USPQ2d 1300, 1301 (BPAI 1993), and *Ex parte Chicago Rawhide Mfg. Co.*, 223 USPQ 351, 353-54 (Bd. App. 1984). The kind of suggestion which would have “*strongly motivated*” one skilled in the art to produce a synthetic

paper that contains the specific antistatic agent as claimed. *Ex parte Graselli*, 231 USPQ 393,394 (Bd. APP. 1983). That is, the kind of suggestion that would have suggested that the specific antistatic agent used in the claimed invention be picked out of a laundry list of various antistatic agents (some listed in Ueda and some incorporated by reference from other references) and used to replace any of the antistatic agents listed in an equally as long laundry list of antistatic agents in Takashi. In other words, the type of motivation that would have driven one skilled in the art to replace any one of the antistatic agents listed in Takashi with the specific one used in the present invention. Especially in view of the fact that contrary to what the Examiner stated in the Final Office Action mailed May 15, 2007, the antistatic agent is listed as working with “polyolefin resin” and not specifically “polypropylene”. (See March 15, 2007 Office Action bottom page 3 top page 4. )

Moreover, Ueda uses the same antistatic agent that the Examiner states one skilled in the art would use to replace the antistatic agent in Takashi to arrive at the claimed invention, not only with polyolefins ( a huge class of compounds) but with a polycarbonate resin, Polymer A\*<sup>4</sup> resin as well as others. Thus, a complete and accurate reading of Ueda would not guide one skilled in the art to use the specific antistatic agent with polypropylene since it the specific antistatic agent is generally disclosed and described as being used with polyolefins, polycarbonates, as well as other polymers. This corrected reading of Ueda in fact dilutes the Examiner’s argument that one skilled in the art would have been lead to use the specific antistatic agent used by the Applicants simply because Ueda states that it works with polyolefins (not polypropylene specifically) since Ueda also states it works with polycarbonates and

other polymers as well. A clear motivation to do what the Applicants have done is however, what a conclusion of obviousness requires. See *Levengood*, supra.

Moreover, neither Takashi nor Ueda state that there is any problem with using any of the many antistatic agents listed in these two patents, therefore it is not seen why one skilled in the art would be motivated to redevelop the Takashi synthetic paper to arrive at the claimed invention. Especially, in view of the numerous other antistatic agents that are disclosed in Takashi, Ueda and Ohba and that it is NOT specifically disclosed that the antistatic agent be used with the specific compound, polypropylene.

The requirement for providing the suggestion and/or motivation to combine the prior art documents so as to do what the Applicants have done in order to support a finding of obviousness was recently reinforced in the Supreme Court decision, *KSR Int'l Co. v. Teleflex, Inc.*, Slip Opinion No 04-1350 (U.S. April 30, 2007). In this case, the Court noted the importance in identifying "a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements" in the manner claimed. To facilitate review, this analysis should be made explicit. (*KSR*, slip op. at 14).

Here, the Examiner alleges that one skilled in the art would be motivated to replace the antistatic agent used in Takashi with a particular antistatic agent used in Ueda to arrive at the claimed invention simply because Ueda states that the specific antistatic agent can be used with "polypropylene." However, as stated above, Ueda does not lead one skilled in the art to substitute the specific antistatic agent with the polypropylene as claimed since the antistatic agents can either be used with polycarbonates and other polymers as well. In fact, Ueda does not even state that the antistatic agents described in the claims be used in a "polypropylene" resin but instead states the much broader class of compounds, namely polyolefins. Therefore, in view of the foregoing remarks, it is respectfully asserted that the

Examiner has failed to provide a reason that would have “*prompted a person of ordinary skill in the relevant field to combine the prior art elements in the manner claimed.*” (See *KSR v. Teleflex*, *supra*).

Accordingly, what the rejection actually boils down to is one “could have” or “would have been able to” do what the Applicants have done. That, however, is not the standard under 35 USC §103, and has long been rejected as a substitute for the elements required of an Examiner to meet his burden of establishing a prima facie case of obviousness (*Ex parte*, *supra* at 1301; and *Ex parte Markowitz*, 143 USPQ 303, 305 (Bd. App. 1964).

In addition, it is fundamental that it is impermissible within the framework of §103 to *pick and choose from any one reference only so much of it as will support a given position*, to the exclusion of other parts necessary to achieve full appreciation of what such reference fairly suggests to one of ordinary skill in the art.” *In re Wesslau*, 147 USPO 391,393 (CCPA 1965). In addition, as is fundamental, “[a] prior art reference must be considered in its entirety, *i.e.*, as a whole, *including portions that would lead away from the claimed invention.*” (Underline original, bold emphasis added). See MPEP § 2141.02 at 2100-95. A primary reference, such as Takashi, that when read in its entirety actually “teaches away” from the claimed invention by the mere fact that many other antistatic agents are provided, *is* sufficient to show that one would *not* have combined the references. See MPEP § 2145 at 2100-123 (“It is improper to combine references where the references teach away from their combination.”). Here, as stated above, Takashi as well as Ueda explicitly teaches many, many, antistatic agents that can be used, and does not explicitly state that the claimed antistatic agent be used with polypropylene synthetic papers. And that is what one of ordinary skill in the art would have taken away from Takashi and Ueda. And that, is not suggestive of what is claimed.

Finally, it is clear from the Examiner's limited reading and choosing only the compounds from the prior art that support the Examiner's position without any clear suggestion or motivation to do so that the Examiner has used impermissible hindsight reconstruction in order to arrive at the claims. A practice that has long been seen as been rejected by the Patent Office and the Courts.

Accordingly, it is respectfully submitted that the Examiner has not meet his burden of establishing a *prima facie* case of the cited art and the Appellants respectfully request that the rejections be reconsidered and reversed.

(L) DEPENDENT CLAIMS 30-49 ALSO RECITE PATENTABLE SUBJECT MATTER OVER THE APPLIED ART.

Takashi et al., Ueda et al. and Ohba et al. all fail to disclose the specific stretching amounts of the specific paper recited in Claim 30. These three references contain no disclosure of the paper having the specific void content as recited in Claim 31; the microvoid volume % range at column 7, lines 7-54 of Ohba et al. is different from the claimed range. In this regard, it is pointed out none of these references disclose explicit formation of cracks on the surface of the stretched film through which antistatic agent can penetrate to the surface of the film.

The specific oxidation treatments of the specific paper composition recited in Claim 32 are not disclosed in any of these references, with the specific corona discharge level recited in Claim 33 also not disclosed. The particular viscosity values of components B and C respectively recited in Claims 34 and 38 are neither disclosed nor suggested by these references. The specific structure of paper composition recited in Claim 47 is not taught in either Takashi et al. or Ohba et al., with Ueda et al. not even directed to a paper, as set forth supra.

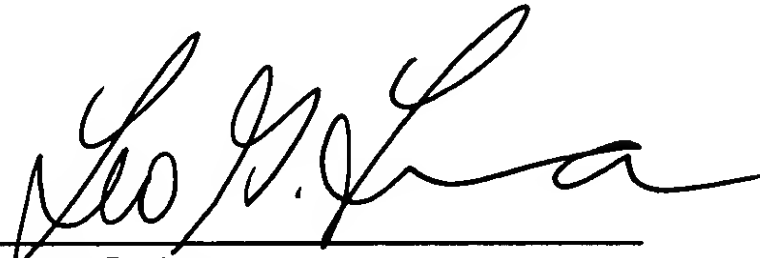
The specific thickness ranges of the paper and constituent layers as recited in Claims 46 and 48 are not taught in any of these three references, while the stretching into long particles recited in Claim 49 is not disclosed in any of this art. Finally, the specific combination of components recited in Claims 35-37 and 39-45 is neither disclosed nor suggested in these three references.

All of the features recited in the dependent claims result in the advantageous improvements in paper-handling well-documented in the present application and accompanying four Declarations from joint inventor Masaaki Yamanaka.



### CONCLUSION

For all of the foregoing reasons, it respectfully is submitted that the Examiner has failed to make out a *prima facie* case of obviousness and hence the rejection of claims 1 – 21 under 35 USC § 103 should be reconsidered and reversed.

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## CLAIMS APPENDIX

1. A synthetic paper having a film obtained by oxidizing the surface of a film obtained by stretching a resin film, said resin film comprising as the base material a resin composition consisting essentially of 100 parts by weight of resin components and from 10 to 250 parts by weight of component E: fine inorganic particles;

said resin components comprising, based on the total weight of the resin components;

55-90 wt% of component A: a polypropylene resin,

5-40 wt% of component B: a polyetheresteramide containing aromatic rings which is derived from

component b1: a polyamide having a number-average molecular weight of from 200 to 5,000 and containing a carboxyl group at each end, and

component b2: an alkylene oxide adduct of bisphenol having a number-average

molecular weight of from 300 to 5,000,

3-20 wt% of component C: a polyamide resin, and

1-20 wt% of component D: at least one modified low-molecular weight polypropylene selected from the group consisting of

component d1: an acid-modified low-molecular weight polypropylene having a

number-average molecular weight of from 800 to 25,000 and an acid value of from 5 to 150,

component d2: a hydroxy-modified low-molecular weight polypropylene having a number-average molecular weight of from 800 to 25,000 and a hydroxyl value of from 5 to 150, and

component d3: an ester-modified low-molecular weight polypropylene obtained by partly or wholly esterifying component d1 with a polyoxyalkylene compound and having a number-average molecular weight of from 1,000 to 28,000;

said stretching being conducted at a temperature lower than the melting point of the polypropylene resin as component A, said stretching and oxidation of said stretched film generating ultra fine cracks on a surface of said stretched film through which component B as permanent antistatic agent appears and possessing gloss of from 15 to 60% and opaqueness of from 83 to 96%.

#### Claims 2-27 (Cancelled)

28. A synthetic paper having a film obtained by oxidizing the surface of a film obtained by stretching a resin film, said resin film comprising as the base material a resin composition consisting essentially of

100 parts by weight of resin components and from 10 to 250 parts by weight of component E: fine inorganic particles;

said resin components comprising, based on the total weight of the resin components;

55-90 wt% of component A: a polypropylene resin,

5-40 wt% of component B: a polyetheresteramide containing aromatic rings which is derived from

component b1: a polyamide having a number-average molecular weight of from 200 to 5,000 and containing a carboxyl group at each end, and

component b2: an alkylene oxide adduct of bisphenol having a number average molecular weight of from 300 to 5,000,

3-20 wt% of component C: a polyamide resin, and

1-20 wt% of component D: at least one modified low-molecular weight polypropylene selected from the group consisting of

component d1: an acid-modified low-molecular weight polypropylene having a number-average molecular weight of from 800 to 25,000 and an acid value of from 5 to 150,

component d2: a hydroxy-modified low-molecular weight polypropylene having a number-average molecular weight of from 800 to 25,000 and a hydroxyl value of from 5 to 150, and

component d3: an ester-modified low-molecular weight polypropylene obtained by partly or wholly esterifying component d1 with a polyoxyalkylene compound and having a number-average molecular weight of from 1,000 to 28,000;

said stretching being conducted at a temperature lower than the melting point of the polypropylene resin as component A, said stretching and oxidation of said stretched film generating ultra fine cracks on a surface of said stretched film through which component B as permanent antistatic agent appears.

29. A synthetic paper having a film obtained by oxidizing the surface of a film obtained by stretching a resin film, said resin film comprising as the base material a resin composition consisting essentially of

100 parts by weight of resin components and from 10 to 250 parts by weight of component E: fine inorganic particles;

said resin components comprising, based on the total weight of the resin components;

55-90 wt% of component A: a polypropylene resin,

5-40 wt% of component B: a polyetheresteramide containing aromatic rings which is derived from

component b1: a polyamide having a number-average molecular weight of from 200 to 5,000 and containing a carboxyl group at each end, and

component b2: an alkylene oxide adduct of bisphenol having a number-average molecular weight of from 300 to 5,000,

3-20 wt% of component C: a polyamide resin, and

1-20 wt% of component D: at least one modified low-molecular weight polypropylene selected from the group consisting of

component d1: an acid-modified low-molecular weight polypropylene having a number-average molecular weight of from 800 to 25,000 and an acid value of from 5 to 150,

component d2: a hydroxy-modified low-molecular weight polypropylene having a number-average molecular weight of from 800 to 25,000 and a hydroxyl value of from 5 to 150, and

component d3: an ester-modified low-molecular weight polypropylene obtained by partly or wholly esterifying component d1 with a polyoxyalkylene compound and having a number-average molecular weight of from 1,000 to 28,000;

said stretching being conducted at a temperature lower than the melting point of the polypropylene resin as component A.

30. The synthetic paper as claimed in claim 28 wherein the stretched resin film is one obtained by compounding a resin composition comprising the polypropylene resin as component A, the polyetheresteramide having aromatic rings as component B, the polyamide resin as component C, and the modified low-molecular weight polypropylene as component D with the fine inorganic particles as component E, melt-extruding the resulting resin composition into a film, and then stretching the extrudate with an ordinary uni- or biaxially stretching machine either uniaxially from 3 to 8 times or biaxially from 10 to 60 times in terms of areal ratio at a temperature lower than the melting point of the polypropylene resin.

31. The synthetic paper as claimed in Claim 28, wherein the stretched resin film has a void content of from 10 to 60% as calculated using the following equation (1):

$$\text{Void content (\%)} = (P^\circ - p) \times 100/p^\circ \quad (1)$$

wherein  $P^\circ$  is a density of the unstretched film, and  $p$  is a density of the stretched film.

32. The synthetic paper as claimed in Claim 28, wherein the oxidation of the surface of the stretched resin film is conducted by a treatment selected from corona discharge treatment, flame-plasma treatment, flame treatment, glow discharge treatment, and ozone treatment.

33. The synthetic paper as claimed in Claim 32, wherein the corona discharge treatment is performed in an amount of from 20 to 500 W/min • m<sup>2</sup>.

34. The synthetic paper as claimed in Claim 28, wherein the polyetheresteramide having aromatic rings as component B has a reduced viscosity (0.5 wt% m-cresol solution, 25°C) of from 0.5 to 4.0.

35. The synthetic paper as claimed in Claim 28, wherein the polyetheresteramide having aromatic rings as component B is a polymer derived from the following components b1 and b2:

component b1: a polyamide having a number-average molecular weight of from 500 to 3,000 and containing a carboxyl group at each end,

component b2: an alkylene oxide adduct of bisphenol having a number-average molecular weight of from 1,000 to 3,000.

36. The synthetic paper as claimed in Claim 28, wherein the polyetheresteramide having aromatic rings as component B is a polymer synthesized from  $\epsilon$ -caprolactam, an ethylene oxide adduct of bisphenol A, and adipic acid.

37. The synthetic paper as claimed in Claim 28, wherein the polyetheresteramide having aromatic rings as component B is a polymer synthesized from 12-aminododecanoic acid, adipic acid, and an ethylene oxide adduct of bisphenol A.

38. The synthetic paper as claimed in Claim 28, wherein the polyamide resin as component C has a reduced viscosity (97% sulfuric acid, concentration 1 g/100 ml, 30°C) of from 0.8 to 5.

39. The synthetic paper as claimed in Claim 28, wherein the polyamide resin as component C is a polyamide selected from the group consisting of nylon 66, nylon 69, nylon 610, nylon 612, nylon 6, nylon 11, nylon 12, nylon 46, nylon 6/66, nylon 6/10, nylon 6/12, and nylon 6/66/12.

40. The synthetic paper as claimed in Claim 28, wherein the modified low-molecular weight polypropylene as component D is at least one member selected from the following components d1 to d3:

component d1: a modified low-molecular weight polypropylene having a number-average molecular weight of from 1,000 to 20,000 and an acid value of from 10 to 100,

component d2: a modified low-molecular weight polypropylene having a number-average molecular weight of from 800 to 25,000 and a hydroxyl value of from 10 to 100,

component d3: a modified low-molecular weight polypropylene obtained by partly or wholly esterifying component d1 with a polyoxyalkylene compound and having a number-average molecular weight of from 1,200 to 25,000.

41. The synthetic paper as claimed in Claim 28, wherein the modified low-molecular weight polypropylene as component D is a polymer obtained by reacting a low-molecular weight polypropylene having a number-average molecular weight of from 700 to 20,000 with an unsaturated acid selected from acrylic acid, methacrylic acid, maleic acid, maleic anhydride, fumaric acid, itaconic acid, itaconic anhydride, and citraconic anhydride.

42. The synthetic paper as claimed in Claim 41 wherein the modified low-molecular weight polypropylene as component D is a polymer obtained by additionally reacting the modified low-molecular weight polypropylene with an aliphatic amine selected from monomethanolamine, monoisopropanolamine, diethanolamine, and diisopropanolamine.

43. The synthetic paper as claimed in Claim 41, wherein the modified low-molecular weight polypropylene as component D is a polymer obtained by additionally



esterifying part or all of the carboxylic acid moieties of the modified low-molecular weight polypropylene with a hydroxylated polyoxyalkylene compound.

44. The synthetic paper as claimed in Claim 28, wherein the fine inorganic particles as component E are particles of at least one member selected from calcium carbonate, calcined clay, silica, diatomaceous earth, talc, titanium oxide, lithium chloride, potassium chloride, magnesium chloride, calcium chloride, sodium bromide, potassium bromide, and magnesium bromide.

45. The synthetic paper as claimed in Claim 28, wherein the resin composition comprises 100 parts by weight of resin components consisting of

component A: a polypropylene resin	60-85 wt%
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component B: the polyetheresteramide	
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having aromatic rings	5-30 wt%
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component C: a polyamide resin	3-15 wt%
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and

component D: the modified low-molecular	
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weight polypropylene	3-15 wt%
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the total amount of all resin components being 100 wt% and from 10 to 250 parts by weight of

component E: fine inorganic particles.	
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46. The synthetic paper as claimed in Claim 28, which has a thickness of from 8 to 300  $\mu\text{m}$ .

47. A synthetic paper which comprises a biaxially stretched thermoplastic resin film base material and, laminated thereto on each side, a surface layer consisting of a uniaxially stretched film of the resin composition as claimed in Claim 28.

48. The synthetic paper as claimed in Claim 46, wherein the surface layer consisting of the stretched film of the resin composition has a thickness of from 5 to 50  $\mu\text{m}$ , and the total thickness of all constituent layers is from 8 to 300  $\mu\text{m}$ .

49. The synthetic paper as claimed in Claim 28, wherein components B, C, and D are elongated by the stretching into long particles.

## **EVIDENCE APPENDIX**

Copies of the following five Declarations I-IV from joint inventor Masaaki Yamanaka are appended hereto:

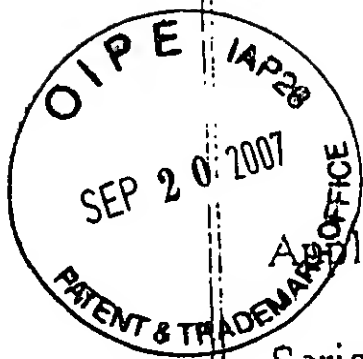
Initial Declaration executed October 6, 1999 (Yamanaka I Declaration);

First Supplemental Declaration executed March 22, 2001 (Yamanaka II Declaration);

Second Supplemental Declaration executed July 12, 2002 (Yamanaka III Declaration); and

Third Supplemental Declaration executed May 19, 2003 (Yamanaka IV Declaration).

Fourth Supplemental Declaration executed July 31, 2006 (Yamanaka V Declaration).



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Yamanaka et al.

Examiner: Kruer, K.

Serial No.: 08/855,905

Group Art Unit: 1773

Filed: May 14, 1997

Docket: 443-17

For: SYNTHETIC PAPER MADE OF  
STRETCHED POLYPROPYLENE FILM

Assistant Commissioner for Patents  
Washington, D.C. 20231

DECLARATION

Sir:

I, Masaaki Yamanaka, do hereby declare:

1. I am one of the joint inventors of the present U.S. application;
2. I have been engaged in research and development of synthetic paper at Oji-Yuka Synthetic Paper Co., Ltd. since 1969;
3. I am an inventor of the following U.S. Patents: U.S. Patent Nos. 4,097,645; 4,340,639; 4,341,880; 4,418,112; 4,420,530; 4,472,227; 4,483,965; 4,663,216; 4,705,719; 4,795,676; 4,986,866; 5,254,302; 5,332,542; 5,409,754 and 5,670,225 and the corresponding foreign patents such as Japanese and European patents;
4. The experimentation outlined in the present U.S. application, the results thereof being documented in Tables 1 and 2 therein, was carried out with my involvement, direction and supervision;

5. The following additional Experiments 1 and 2; the results presented in accompanying Tables 1-3, was also carried out with my involvement, direction and supervision:

#### Experiment 1

A duplicate experiment was made on Example 2 of U.S. Patent No. 4,318,950 (invention made by the parent company of Oji-Yuka Synthetic Paper Co., Ltd., which is one of the present assignees (This technique has been transferred to Oji-Yuka Synthetic Paper Co., Ltd.)).

A resin composition (A) comprising 90 parts by weight of NOVATEC PP MA-8 (polypropylene produced by Japan Polychem Corporation; melting point: 164°C), 10 parts by weight of NOVATEC HD HJ580 (high density polyethylene produced by Japan Polychem Corporation; melting point: 134°C), 5 parts by weight of clay having a particle diameter of 1  $\mu$ m produced by ENGELHARD MINERALS & CHEMICALS CO., 1.0 parts by weight of calcium stearate as a stabilizer, 0.1 parts by weight of TOPANOL (1,3,5-tris(2-methyl-4-hydroxy-5-t-butyl phenol)butane)), 0.3 parts by weight of NYMEEN S-210 (dispersant produced by NOF Corp.) and 0.3 parts by weight of PHOSPHANOL RL-210 (revised name of "PHOSPHANOL SM-1", produced by TOHO Chemical Inc.) as a low-molecular weight antistatic agent was melt-kneaded through an extruder, and then extruded through a die into a sheet at a temperature of 250°C. The sheet thus formed was cooled to a temperature of about 50°C.

Subsequently, the sheet was heated to a temperature of about 140°C where

it was then longitudinally oriented by a factor of 2 utilizing the difference in circumferential speed between rolls to obtain a longitudinally-oriented film. Separately, a resin composition (B) comprising 80 parts by weight of NOVATEC PP MA-8 (polypropylene produced by Japan Polychem Corporation; melting point: 165°C), 20 parts by weight of NOVATEC HD HJ580 (high density polyethylene produced by Japan Polychem Corporation; melting point: 134°C), 5 parts by weight of clay having a particle diameter of 1  $\mu\text{m}$  produced by ENGELHARD MINERALS & CHEMICALS CO., 1.0 parts by weight of calcium stearate as a stabilizer, 0.1 parts by weight of TOPANOL (1,3,5-tris(2-methyl-4-hydroxy-5-*t*-butyl phenol)butane)), 0.3 parts by weight of NYMEEN S-210 (dispersant produced by NOF Corp.) and 1.0 parts by weight of PHOSPHANOL RL-210 (revised name of "PHOSPHANOL SM-1", produced by TOHO Chemical Inc.) as a low-molecular weight antistatic agent was separately melt-kneaded through two extruders, and then extruded through a die onto the respective surface of the foregoing longitudinally-oriented film to obtain a paper-like layer (B)/base layer (A)/paper-like layer (B).

The three-layer film (B/A/B) was introduced into a tenter oven where it was then heated to a temperature of 160°C. The film was then oriented crosswise by a factor of 5 at a temperature of 150°C using the tenter. Subsequently, the film was thermally set at a temperature of 140°C. The film was subjected to corona discharge treatment at 70 W/m<sup>2</sup>/min on the paper-like layer (B layer) side thereof, cooled to a temperature of 55°C, and then slit at the edge thereof to obtain a three-layer synthetic paper having a thickness of 170  $\mu\text{m}$  (B/A/B = 60/50/60  $\mu\text{m}$ ). The synthetic paper thus

obtained was a composite film comprising a biaxially-oriented base layer and two uniaxially-oriented paper-like layers (surface layers).

## Experiment 2

A uniaxially-oriented paper was prepared in the same manner as in Example 1, except that instead of PHOSPHANOL SM-1, PHOSPHANOL RL-210 (produced by TOHO Chemical Inc.) was used as an antistatic agent and the incorporation of the resin component in the surface layer was effected as set forth in Table 2. During the preparation of the synthetic paper, the resin became sticky to the molding roll at the molding step. Thus, the resin could be hardly molded.

Table 3 shows the results of the evaluation of surface resistivity and offset printability of the synthetic papers obtained by Experiments 1 and 2 according to the method described in the present application. Referring to surface resistivity, Experiment 1 (low-molecular weight antistatic agent content: 0.3 parts) shows some improvement ( $6 \times 10^{13} \Omega$ ) before rinsing but shows deterioration ( $6 \times 10^{15} \Omega$ ) after rinsing. Experiment 2 (low-molecular weight antistatic agent content: 16.7 parts) shows a surface resistivity as high as  $4 \times 10^{11} \Omega$  before rinsing but shows a drastic deterioration ( $5 \times 10^{15} \Omega$ ) after rinsing. This is presumably because the low-molecular weight antistatic agent elutes out of the surface of the film during rinsing. Referring to adhesion of ink, both Experiments 1 and 2 evaluated only fair and thus are practically unacceptable. Referring to feedability and dischargeability, both Experiments 1 and 2 evaluated poorly and are liable to frequent trouble in feed and discharge. Thus, Experiments 1 and 2 are practically unacceptable;

6. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

1999. 10. 6  
Date

Masaaki Yamanaka  
Masaaki Yamanaka



NYMEEN S-210: produced by NOF Corp.

Table 2

Final composition of surface layer				Molding/stretching/surface treatment		
Resins (100 parts)		Fine inorganic particles (E)		Thickness (μm)	Stretching of surface layer	of
PP	Modif-	CaCO <sub>3</sub>	TiO <sub>2</sub>	front/core/back	Uni- or biaxial stretching	Surface treatment
	ied PP (D1)					
Ex.1	Blended amount is set forth in Table 1			60/50/60	uniaxial	5 corona
Ex.2	72.3	16.7	5.5	72.7	9.1	20/60/20 uniaxial 8 corona

Table 3

Evaluation			
Surface resistivity		Offset printability	
(a)	(b)	Ink adhesion	Suitability for paper feed/discharge
Ex. 1	6 x 10 <sup>11</sup>	6 x 10 <sup>15</sup>	Fair
Ex. 2	4 x 10 <sup>11</sup>	5 x 10 <sup>15</sup>	Fair

Table 1

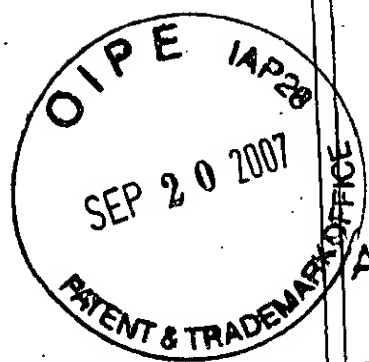
Components: Paper-like layer										
	Resin	Parts	Filler	Parts	Stabilizer	Parts	Anti-static agent	Parts	Dispersing agent	Parts
Ex.1	PP*1	80	clay	5	Ca-stearate	1.0	PHOS-PHANOL SM-1	0.3	NYMEEN S-210	1.0
	PE	20			TOPANOL	0.1				
Components: Base layer										
	Resin	Parts	Filler	Parts	Stabilizer	Parts	Anti-static agent	Parts	Dispersing agent	Parts
Ex.1	PP*2	90	clay	5	Ca-stearate	1.0	PHOS-PHANOL SM-1	0.3	NYMEEN S-210	0.3
	PE	10			TOPANOL	0.1				

PP\*: NOVATEC PP, MA-3, polypropylene produced by Japan Polychem Corporation (melting point: 165°C)

PP': NOVATEC PP, MA-8, polypropylene produced by Japan Polychem Corporation (melting point: 164°C)

PE: NOVATEC HD, HJ580, high density polyethylene produced by Japan Polychem Corporation (melting point: 134°C)

clay: clay having a particle diameter of 1  $\mu$ m produced by ENGELHARD MINERALS & CHEMICALS CO. PHOSPHANOL SM-1: PHOSPHANOL RL-210 (revised name of PHOSPHANOL SM-1), produced by TOHO Chemical, was used.



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Yamanaka et al.

Examiner: Kruer, K.

Serial No.: 08/855,905

Group: Art Unit 1773

Filed: May 14, 1997

Docket: 443-17

For: SYNTHETIC PAPER  
MADE OF STRETCHED  
POLYPROPYLENE FILM

Assistant Commissioner for Patents  
Washington, D.C. 20231

SUPPLEMENTAL DECLARATION

I, Masaaki Yamanaka, do hereby declare:

1. I am the Declarant who executed the previous declaration on October 6, 1999 in the above-identified application;
2. The following additional experimentation was carried out under my supervision and control:

EXPERIMENTATION 1

Experimentation 1 was conducted in the same manner as in Comparative Example 2 in the present application except that corona discharge treatment was carried out as surface treatment.

## EXPERIMENTATION 2

Experimentation 2 was conducted in the same manner as in Comparative Example 3 in the present application except that surface treatment (corona discharge treatment) was not carried out.

Table 1

	Final Composition of Surface Layer				Molding, Stretching/Surface Treatment			
	Resins (100 parts)				Thickness ( $\mu\text{m}$ )	Stretching of Surface Layer		Surface treatment
	PP	PEEA (B1)	PA	Modified PP (D1)	Front/core/back	Uni- or biaxial Stretching	Stretching Ratio	
Ex. 1	82	10.8	3.6	3.6	20/60/20	Uniaxial	8	Corona
Ex. 2	82	10.8	3.6	3.6	20/60/20	No Stretching		None

Table 2

Evaluation						
	Surface Resistivity ( $\Omega$ )		Offset Printability		Optical Property	
	(a)	(b)	Ink Adhesion	Suitability for Paper Feeding/Discharge	Gloss (%)	Opacity (%)
Ex. 1	$8 \times 10^{11}$	$7 \times 10^{11}$	$\Delta$	$\circ$	90	80
Ex. 2	$5 \times 10^{14}$	$5 \times 10^{14}$	X	X	98	60

The symbols in Table 2 denote the following:

Δ: The ink was peeled almost completely to pose a problem in practical use although the peeling force required was not so weak;

O: the number of stops was 1;

X: All the ink was peeled with very weak peeling force and was incapable of practical use and the number of stops was 6 or greater;

3. A copy of Table 3 from the preceding Declaration is enclosed on which the evaluations have been changed from fair to Δ and poor to X to provide consistency with the evaluations presented in the above-identified application and the present supplemental Declaration;

4. Referring to the test results presented herein, in Experimentation 1, the ink adhesion was improved from "X" to "Δ" because the corona discharge treatment was carried out, but in Experimentation 2, the ink adhesion deteriorated from "Δ" to "X" because the corona discharge treatment was omitted; and

5. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

March 22, 2001

Date

Masaaki Yamanaka  
Masaaki Yamanaka

NYMEEN S-210: produced by NOF Corp.

Table 2

	Final composition of surface layer				Molding/stretching/surface treatment	
	Resins (100 parts)		Fine inorganic particles (E)		Thickness (μm)	Stretching of surface layer
	PP	Modif- ied PP (D1)	CaCO <sub>3</sub>	TiO <sub>2</sub>	front/core/ back	Uni- biaxial stret- ching or Stret- ching ratio
Ex.1	Blended amount is set forth in Table 1				60/50/60	5
Ex.2	72.3	16.7	5.5	72.7	9.1	20/60/20
					uniaxial	8
					uniaxial	corona

Table 3

	Evaluation			
	Surface resistivity		Offset printability	
	(a)	(b)	Ink adhesion	Suitability for paper feed/discharge
Ex. 1	6 x 10 <sup>11</sup>	6 x 10 <sup>15</sup>	Δ	X
Ex. 2	4 x 10 <sup>11</sup>	5 x 10 <sup>15</sup>	Δ	X



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Yamanaka et al.

Examiner: Kruer, K.

Serial No.: 08/855,905

Group: Art Unit 1773

Filed: May 14, 1997

Docket: 443-17

For: SYNTHETIC PAPER  
MADE OF STRETCHED  
POLYPROPYLENE FILM

Assistant Commissioner for Patents  
Washington, D.C. 20231

Second Supplemental Declaration under 37 C.F.R. § 1.132

I, Masaaki Yamanaka, do hereby declare:

1. I am the Declarant who executed the previous declarations on October 6, 1999 and March 22, 2001 in the above-identified application;
2. The following experimentation (3 experiments) was carried out under my supervision and control:

A. EXPERIMENT 1

The same procedure as in Example 12 of the invention of Takashi et al. (U.S. Pat. No. 4,318,950) was performed. The same composition as in Tables I(b) and II(b) and the same molding conditions as in Table III of Takashi et al. were used but conditions not described in Takashi et al., such as extrusion temperature, cooling temperature, etc. were replaced by those described in the present application.

A resin composition (A) containing 80 parts by weight of polypropylene (Novatec PP, MA-8 manufactured by Japan Polychem Corp, melting point 164°C), 20 parts by weight of polyamide (extrusion grade Nylon 6, UBE Nylon 1022FDX23



manufactured by Ube Industries, Ltd.), 0.5 part by weight of diatomaceous earth and 0.1 part by weight of dispersing agent (NYMEEN S-210, manufactured by NOF Corp.) was melt-kneaded with an extruder set at 270°C, subsequently extruded into a sheet, and then cooled to a temperature of about 50°C.

After being heated to about 140°C, this sheet was stretched in the machine direction 5 times using a peripheral velocity of rolls to obtain a machine-directionally stretched film.

A resin composition (B) containing 80 parts by weight of polypropylene (Novatec PP, MA-3 manufactured by Japan Polychem Corp, melting point 165°C), 20 parts by weight of polyamide (UBE Nylon 1022FDX 23 manufactured by Ube Industries, Ltd.), 80 parts by weight of clay (particle size 1 micron, manufactured by Englehart Minerals & Chemicals Co.), 0.5 parts by weight of dispersing agent (NYMEEN S-210, manufactured by NOF Corp.) and 0.7 parts by weight of low molecular weight antistatic agent (PHOSPHANOL RL-20, (formerly Phosphanol SM-1), manufactured by Toho Chemical Industry Co. Ltd. and used in Example 1 of Takashi et al. (the low molecular weight antistatic agent of RESISTAT PE132 of Example 12 of Takashi et al. no longer being available) was melt-kneaded with two extruders set at 250°C separately, extruded from the die into a film (A) on both surfaces of the machine-directionally stretched film and then laminated (B/A/B) to form a laminate (paper-like layer/base layer/paper-like layer).

This three layer film (B/A/B) was introduced into a tenter oven, heated to 165°C, stretched in the transverse direction 7 times with a tenter stretching machine at a temperature of 160°C and then heat-set at a temperature of 140°C. Subsequently, the stretched film was treated with 70 W/m<sup>2</sup>·min. corona discharge on the side of the paper-like layer(layer B), cooled to a temperature of 55°C and trimmed. The thickness of the three-layer stretched film was 140 microns and the thickness of the individual layers (B/A/B) were 50 μm/40μm/50μm. The thus obtained synthetic film is a composite film containing a biaxially stretched base layer (A) and two uniaxially stretched paper-like layers (B) (surface layers).

#### B. EXPERIMENT 2

The same procedure as in Experiment 1 was performed except for changing the low molecular weight antistatic agent to a high-molecular weight antistatic agent of the present application, polyetheresteramide (product Example 1(B1) in the present application).

#### C. EXPERIMENT 3

The same procedure as in Experiment 2 was performed except for using the high-molecular weight antistatic agent in an amount of 20 parts by weight (16.7% by weight based on the resin components).

#### D. EXPERIMENT 4

The same procedure as in Example 1 on pages 29-31 of the present application.

The composition of these three Experiments 1-4 supra are set forth in accompanying Table I.

#### C. Evaluation of Experiments 1-4

(1) Surface resistivities of the synthetic papers before and after washing with water and (2) ink adhesion and suitability for paper feeding/discharge as the offset printability, were evaluated according to the procedures set forth in the present application. The results are shown in Table 2 below.

##### (1) Surface Resistivity

The surface resistivity of the synthetic paper containing 0.7 part by weight of low-molecular weight antistatic agent of Experiment 1 was found to be  $2 \times 10^{13} \Omega$  before washing with water, which was somewhat improved, but  $1 \times 10^{16} \Omega$  after washing with water, which deteriorated.

The surface resistivity of the synthetic paper containing 0.7 part by weight of polyetheresteramide of Experiment 2 was  $2 \times 10^{14} \Omega$  before washing with water, which was somewhat improved, and  $2 \times 10^{14} \Omega$  after washing with water, unchanged.

The surface resistivity of the synthetic paper containing 20 parts by weight (16.7% by weight based on the resin composition) of polyetheresteramide of

Experiment 3 was  $1 \times 10^{13} \Omega$  before washing with water, which was somewhat improved and  $1 \times 10^{13}$  after washing with water, unchanged. Because a large amount of polyetheresteramide was added, the polyetheresteramide was insufficiently dispersed, so the surface resistivities of  $10^{10}$  to  $10^{11} \Omega$  as described in the examples of the present application could not be obtained.

The surface resistivity of Experiment 4 was  $4 \times 10^9$  before washing and  $3 \times 10^9$  after washing, a clear improvement after washing.

## (2) Offset Printability

The symbols in Table 2 denote the following:

⊙: The ink remained unpeeled (ink adhesion) and there were no stops (feed/discharge suitability);

Δ: The ink was peeled almost completely to pose a problem in practical use although the peeling force required was not so weak (ink adhesion), and the number of printing stops was 2-5 (feed/discharge suitability); and

X: The number of printing stops was 6 or greater (feed/discharge suitability);

Referring to the results reported in Table 2, the ink adhesion on the synthetic paper of Experiment 1 was Δ and suitability for paper feeding/discharge X because of high surface resistivity;

the ink adhesion on the synthetic paper of Experiment 2 was  $\Delta$ , and the suitability for paper feeding/discharge X because of high surface resistivity; and

the ink adhesion on the synthetic paper of Experiment 3 was  $\Delta$ , and the suitability for paper feeding/discharge  $\Delta$  because of surface resistivity which was still to high; and

both the ink adhesion on the synthetic paper and suitability for paper feeding/discharge of experiment 4 was  $\odot$ .

#### 4. EXPERIMENT 5

1) A composition of Ueda et al. was selected as follows:

(A) Matrix resin: polypropylene (PP) described in the examples of Ueda et al. was used because PP is used as a matrix resin in Takashi et al. and the present invention;

(B) Polyetheresteramide (PEEA): an analogous PEEA to the PEEA used in the present invention was used in view of the examples of Ueda et al.;

(C) Polyamide resin: an analogous resin to polyamide resin used in the present invention was used in view of the examples of Ueda et al.; and

(D) Modified polypropylene (PP) resin: the analogous resin to modified PP resin used in the present invention was used in view of Ueda et al.

According to components (A) to (B) as described above, Example 43 as described on page 32 of Ueda et al. was selected as a composition of the invention of Ueda et al. More particularly, (A) the PP described on page 15, line 48 of Ueda et al, injection grade UBE Polypro J609 MFR 9g/min at 230°C and a load of 2.16 kg according to ASTM D-1238, was used; (B) the PEEA described on page 13, lines 25 to 34 of Ueda et al., which is an analogous PEEA to that of production Example 1 of the present application, was used; (C) the polyamide resin as described on page 15, line 46 of Ueda et al., Nylon 6 (UBE Nylon 1013B) was used; and (D) a modified PP described on page 22, lines 19 to 27 of Ueda et al, analogous to that of production Example 3 of the present application, was used. The compounding ratio was the same as in Example 43 which is described on page 32 of Ueda et al.

## 2) Compounding of the base layer

The compounding of the base layer was conducted according to Example 12 as described in Table I(b) at columns 9 to 10 in Takashi et al. A master batch was prepared from a composition obtained by adding the inorganic filler of example 12 of Takashi et al. in the amount of 0.5 part by weight diatomaceous earth, to the composition of example 43 of the invention of Ueda et al. in the same manner as described in Example 1, step (2) on pages 29-30 of the present application.

### 3) Compounding of the paper-like layer

The compounding of the paper-like layer was conducted as described in Example 12 at Table II(b), columns 11 to 12 of Takashi et al. A master batch was prepared from a composition obtained by adding the inorganic filler of Example 12 (80 parts by weight of clay) of Takashi et al. to the composition of Example 43 of the invention of Ueda et al. in the same manner as described in Example 1, step (2) of the present application on pages 29-30.

### 4) Production of the base layer film

Because Takashi et al. do not describe the extrusion condition in detail, the same extrusion conditions as described in Example 1, step (1) at page 29 of the present application was used. The master batch for the base layer obtained in step (2) above was melt kneaded in an extruder set at 270°C, extruded into a sheet and cooled in a cooler to obtain an unstretched sheet. The extruded sheet was stretched 5 times using rolls under the production conditions of Example 12 of Takashi et al. as described in Table III, column 13 of Takashi et al., at 145°C.

### 5) Production of the paper-like layer film

The master batch for the paper-like layer obtained in step (3) above was melt kneaded at 250°C and laminated, using two extruders, to both sides of the

stretched sheet having a stretching ratio of 5 obtained in step (4) above at 250°C as described in Table III, column 13 of Takashi et al. The sheet having the three-layer structure was heated to 165°C as described in Table III, column 13 of Takashi et al., and attempted to be stretched in the transverse direction 8 times with a tenter stretching machine at a temperature of 160°C as described in Table III, column 13 of Takashi et al.

However, when the sheet was stretched in the transverse direction, the sheet was broken at a portion clipped by a chuck of the tenter stretching machine, so a biaxially stretched sheet could not be obtained. It is believed that this occurred because the polypropylene (PP) of grade suitable for injection molding as described in the examples of Ueda et al. has MFR of 9 g/min, high flowing property and low melting tension. When the PP was stretched in the transverse direction with a chuck of the tenter stretching machine heated at a temperature of 160°C, which is a temperature close to the melting point of PP, the sheet was broken and thus could not be stretched. A fusion bond of the sheet was then observed on the chuck after the sheet was broken.

Further, the stretching of the base layer in the machine direction with rolls, before the stretching with the tenter stretching machine could be performed, because the stretching temperature was as low as 150°C and the stretching ratio was as low as 5. In stretching in the machine direction there is no restriction of fixing in the transverse direction, i.e., the sheet is free to move in the transverse direction, so the sheet is



constricted in the transverse direction while stretched in the machine direction; this is different from stretching with the tenter stretching machine.

As documented above, it is clear that the biaxially stretched film is difficult to produce with the composition of Ueda et al. under the conditions of Takashi et al.

Table 1

Components: Base Layer									
	Resin	Parts	Filler	Parts	Anti-Static Agent	Parts	Dispersing Agent	Parts	
Ex. 1	PP <sup>1</sup>	80	Kiesel-	0.5			NYMEEN S-210	1.0	
	Polymide <sup>3</sup>	20	Guhr						
	PP <sup>1</sup>	80	Kiesel-	0.5			NYMEEN S-210	1.0	
Ex. 2	Polymide <sup>3</sup>	20	Guhr						
	PP <sup>2</sup>	80	Kiesel-	0.5			NYMEEN S-210	1.0	
Ex. 3	Polymide <sup>3</sup>	20	Guhr						
	PP <sup>2</sup>	80	Kiesel-	0.5					
Ex. 4	Polymide <sup>3</sup>	20	Guhr						
Example 1 of the Present Application									
Components: Paper-like Layer									
	Resin	Parts	Filler	Parts	Anti-Static Agent	Parts	Dispersing Agent	Parts	
Ex. 1	PP <sup>2</sup>	80	Clay	80	PHOSPANOL SM-1	0.7	NYMEEN S-210	0.5	
	Polymide <sup>3</sup>	20							
	PP <sup>2</sup>	80	Clay	80	PEEA	0.7	NYMEEN S-210	0.5	
Ex. 2	Polymide <sup>3</sup>	20							
	PP <sup>2</sup>	80	Clay	80	PEEA	20	NYMEEN S-210	0.5	
Ex. 3	Polymide <sup>3</sup>	20							
	PP <sup>2</sup>	80	Clay	80	PEEA				
Ex. 4	Polymide <sup>3</sup>	20							
Example 1 of the Present Application									

PP<sup>1</sup> : Polypropylene, "Novatec PP, MA-8" (trade name, melting point of 164°C) manufactured by Japan Polychem Corp.

PP<sup>2</sup> : Polypropylene, "Novatec PP, MA-3" (trade name, melting point of 165°C) manufactured by Japan Polychem Corp.

Polyamide<sup>3</sup>:Nylon 6, "UBE Nylon 1022FDX23" (trade name), manufactured by Ube Industries, Ltd.

PHOSPHANOL SM-1: "Phosphanol RL-210" (trade name has been changed), manufactured by Toho Chemical Industry,

Co., Ltd.

NYMEEN S-210: Manufactured by NOF Corp.

PEEA: polyetheresteramide of Production Example 1 of the present application.

Table 2

	Molding/stretching/surface Treatment				Evaluation		
	Thickness (μm) Front/core/back	Stretching of Surface Layer		Surface treatment	Surface Resistivity (Ω)		Offset Printability
		Uni- or biaxial stretching	Stretching ratio		(a)	(b)	
Ex. 1	50/40/50	uniaxial	7	Corona	2x10 <sup>13</sup>	1x10 <sup>18</sup>	Δ X
Ex. 2	50/40/50	uniaxial	7	Corona	2x10 <sup>14</sup>	2x10 <sup>14</sup>	Δ X
Ex. 3	50/40/50	uniaxial	7	Corona	1x10 <sup>13</sup>	1x10 <sup>13</sup>	Δ
Ex. 4	20/60/20	uniaxial	8	Corona	4x10 <sup>11</sup>	3x10 <sup>11</sup>	⊙

5. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

July 12 2007  
Date

Masaaki Yamamoto  
Masaaki Yamamoto



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant(s): Yamanaka et al.

Examiner: Kruer, K.

Serial No.: 08/855,905

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Filed: May 14, 1997

Docket: 443-17

For: SYNTHETIC PAPER  
MADE OF STRETCHED  
POLYPROPYLENE FILM

Assistant Commissioner for Patents  
Washington, D.C. 20231

**THIRD SUPPLEMENTAL DECLARATION UNDER 37 C.F.R. § 1.132**

I, Masaaki Yamanaka, do hereby declare:

1. I am the Declarant who executed the previous Declarations on October 6, 1999, March 22, 2001 and July 12, 2002 in the above-identified application;
2. The following additional experimentation (8 Experiments) was carried out under my supervision and control:

A. Experiment 1

The same procedure as in Experiment 1 of the Second Supplemental declaration under 37 C.F.R. § 1.132 was performed. Example 12 of the invention of Takashi et al. (U.S. Pat. No. 4,318,950) was reproduced. The same compositions as in Table I(b) and Table II(b) and the same molding conditions as in Table III of Takashi et al. were used but the conditions which are not described in Takashi et al. such as extrusion temperature, cooling temperature, etc., were replaced by those as described in the present invention.

A resin composition (A) containing 80 parts by weight of polypropylene ("Novatec PP, MA-8" (trade name) manufactured by Japan Polychem Corp., a melting point of 164°C), 20 parts by weight of polyamide (extrusion grade Nylon 6, "UBE Nylon 1022FDX23" (trade name), manufactured by Ube Industries, Ltd.), 0.5 part by weight of diatomaceous earth and 0.1 part by weight of dispersing agent (NYMEEN S-210, manufactured by NOF Corp.) was melt-kneaded with an extruder set at 270°C, subsequently extruded into a sheet, and then cooled to a temperature of about 50°C.

After being heated to about 140°C, this sheet was stretched in the machine direction 5 times using a peripheral velocity of rolls to obtain a machine-directionally stretched film.

A resin composition (B) containing 80 parts by weight of polypropylene ("Novatec PP, MA-3" (trade name) manufactured by Japan Polychem Corp., a melting point of 165°C), 20 parts by weight of polyamide ("UBE Nylon 1022FDX23" (trade name), manufactured by Ube Industries, Ltd.), 80 parts by weight of clay (particle size of 1µm, manufactured by Engelhard Minerals & Chemicals Co.), 0.5 part by weight of dispersing agent (NYMEEN S-210, manufactured by NOF Corp.) and 0.7 part by weight of low molecular weight antistatic agent ("PHOSPHANOL RL-210" (trade name has been changed from SM-1), manufactured by Toho Chemical Industry Co., Ltd.) (Because the low molecular weight antistatic agent "RESISTAT PE132" (trade name) used in Example 12 of U.S. Patent 4,318,950 is not available because of retirement, the

low molecular weight antistatic agent used in Example 1 of U.S. Patent 4,318,950 was used.) was melt kneaded with two extruders set at 250°C separately, extruded from the die into a film on both surfaces of the machine-directionally stretched film and then laminated (B/A/B) to form a laminate (paper-like layer/base layer/paper-like layer).

This three-layer film (B/A/B) was introduced into a tenter oven, heated to 165°C, stretched in the transverse direction 7 times with a tenter stretching machine at a temperature of 160°C and then heat-set at a temperature of 140°C. Subsequently, the stretched film was treated with 70 W/m<sup>2</sup> min. corona discharge on the side of the paper-like layer (layer B), cooled to a temperature of 55°C, and trimmed. The thickness of the three layer stretched film was 140µm and the thicknesses of the individual layers ((B)(A)(B)) of the three layer stretched film were 50µm/40µm/ 50µm. The thus obtained synthetic film is a composite film containing biaxially stretched base layer and two uniaxially stretched paper-like layers (surface layers).

#### B. Experiment 2

The same procedure as in Experiment 1 was performed except that the corona discharge was omitted.

#### C. Experiment 3

The same procedure as in Experiment 1 was performed except that the paper-like layer was not formed as the back surface layer (only two layers, A/B, present).

**D. Experiment 4**

The same procedure as in Experiment 1 was performed except that the base layer and the paper-like layer as the back surface layer were not formed (only one layer, B, present).

**E. Experiment 5**

The same procedure as in Example 1 of the present application was performed.

**F. Experiment 6**

The same procedure as in Experiment 1 was performed except that the paper-like layer was not formed as the back surface layer (only two layers, A/B, present).

**G. Experiment 7**

The same procedure as in Experiment 5 was performed except that the base layer and the paper-like layer as the back surface layer were not formed, and that the thickness of the paper-like layer as the front surface layer was changed to 50 $\mu$ m (the reason why the thickness was changed is that it was difficult to obtain a 1 layer film having a thickness of 20 $\mu$ m and having the composition of the paper-like layer as described in Experiment 5).



#### H. Experiment 8

The same procedure as in Experiment 1 was performed except that the base layer and the paper-like layer each had the composition described in Table 1 below (the compositions of Experiments 1-8 are presented in Table 1).

#### 3. Evaluation of Experiments 1-8

According to the evaluation methods of synthetic papers of the present invention, (1) surface resistivities of the synthetic papers before and after washing with water and (2) ink adhesion and suitability for paper feeding/discharge as the offset printability, were evaluated. The thus obtained results are shown in Table 2 below.

##### (1) Surface Resistivity

The surface resistivity of the synthetic paper (containing 0.7 part by weight of low molecular weight antistatic agent) of each of Experiments 1 to 4 was  $2 \times 10^{13} \Omega$  before washing with water (a), which was somewhat improved, but was  $1 \times 10^{16} \Omega$  after washing with water, which deteriorated.

Resistivity of the synthetic paper of each of Experiments 5 to 7 did not change as compared with that of Example 1 of the present application.

The surface resistivity of the synthetic paper (containing 40 % by weight (66.7 parts by weight based on the resin components) of polyetheresteramide) of Experiment 8 was  $6 \times 10^{12} \Omega$  before washing with water (a), which was somewhat improved, and was  $6 \times 10^{12} \Omega$  after washing with water, which was unchanged. Because

a large amount of polyetheresteramide was added. polyetheresteramide was insufficiently dispersed, so surface resistivities of  $10^{10}$  to  $10^{11}$   $\Omega$  as described in the Examples of the present application could not be obtained.

## (2) Offset Printability

Referring to the symbols on page 5 of the second Supplemental Declaration, the ink adhesion on the synthetic paper of each of Experiments 1, 3, and 4 was  $\Delta$ , and the suitability for paper feeding/discharge was X because of high surface resistivity.

The ink adhesion on the synthetic paper of Experiment 2 was X, and the suitability for paper feeding/discharge was X because of high surface resistivity.

The ink adhesion and suitability for paper feeding/discharge of synthetic paper of each of Experiments 5 to 7 were similar to those of Example 1 of the present application.

The ink adhesion on the synthetic paper of Experiment 8 was  $\Delta$ , and the suitability for paper feeding discharge was  $\Delta$ .

Components: base Layer							
	Resin	Parts	Filler	Parts	Anti-static Agent	Parts	Dispersing Agent
Ex. 1 to Ex. 3	PP <sup>*1</sup>	80	Kiesel-Guhr	0.5			NYMEEN S-210
	Polyamide <sup>*3</sup>	20					
Ex. 4	No base layer						
Ex. 5 and Ex. 6	The composition of Example 1 of the present application						
Ex. 7	No base layer						
Ex. 8	PP <sup>*1</sup>	80	Kiesel-Guhr	0.5			NYMEEN S-210
	Polyamide <sup>*3</sup>	20					
Components: Paper Like Layer							
	Resin	Parts	Filler	Parts	Anti-static Agent	Parts	Dispersing Agent
Ex. 1 to Ex. 4	PP <sup>*2</sup>	80	Clay	80	PHOSPANOL SM-1	0.7	NYMEEN S-210
	Polyamide <sup>*3</sup>	20					
Ex. 5 to Ex. 7	The composition of Example 1 of the present application						
Ex. 8	PP <sup>*2</sup>	80	Clay	80	PEEA	66.7	NYMEEN S-210
	Polyamide <sup>*3</sup>	20					

TABLE 1

PP\*1: Polypropylene, "Novatec PP, MA-8" (trade name, melting point of 164°C). Manufactured by Japan Polychem Corp.

PP\*2: Polypropylene, "Novatec PP, MA-3" (trade name, melting point of 165°C). Manufactured by Japan Polychem Corp.

Polyamide\*3: Nylon 6, "UBE Nylon 1022FDX23" (trade name),  
Manufactured by UBE Industries, Ltd.

PHOSPHANOL SM-1: "PHOSPHANOL RL-210" (trade name has been changed), manufactures by Toho chemical Industry Co., Ltd.

NYMEEN S-210: manufactured by NOF Corp.

PEEA: polyetheresteramide of Production Example 1 of the present application.

	Molding/Stretching/Surface Treatment				Evaluation			
	Thickness	Stretching of Surface Layer		Surface Treatment	Surface Resistivity ( $\Omega$ )		Offset Printability	
		Uni- or Biaxial Stretching	Stretching Ratio		(A)	(B)	Ink Adhesion	Suitability for Paper Feeding/discharge
Ex. 1	50/40/50	Uniaxially	7	Corona	$2 \times 10^{13}$	$1 \times 10^{16}$	$\Delta$	x
Ex. 2	50/40/50	Uniaxially	7	None	$2 \times 10^{13}$	$1 \times 10^{16}$	x	x
Ex. 3	50/40	Uniaxially	7	Corona	$2 \times 10^{13}$	$1 \times 10^{16}$	$\Delta$	x
Ex. 4	50	Uniaxially	7	Corona	$2 \times 10^{13}$	$1 \times 10^{16}$	$\Delta$	x
Ex. 5	20/50/20	Uniaxially	8	Corona	$4 \times 10^{11}$	$3 \times 10^{11}$	$\odot$	$\odot$
Ex. 6	20/50	Uniaxially	8	Corona	$4 \times 10^{11}$	$3 \times 10^{11}$	$\odot$	$\odot$
Ex. 7	50	Uniaxially	8	Corona	$4 \times 10^{11}$	$3 \times 10^{11}$	$\odot$	$\odot$
Ex. 8	50/40/50	Uniaxially	7	Corona	$6 \times 10^{12}$	$6 \times 10^{12}$	$\Delta$	$\Delta$

TABLE 2

4. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

May 19, 2003  
Date

Masaaki Yamataka  
Masaaki Yamataka



PATENT APPLICATION  
Attorney Docket: 443-17

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Yamanaka et al.

Examiner: Kruer, Kevin R.

Serial No.: 08/855,905

Group: Art Unit: 1773

Filed: May 14, 1997

Dated: DRAFT

For: **SYNTHETIC PAPER MADE OF STRETCHED POLYPROPYLENE FILM**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**FOURTH SUPPLEMENTAL DECLARATION**

Sir:

I, Masaaki Yamanaka, do hereby declare:

1. I am one of the joint inventors of the present U.S. application;
2. I have been engaged in research and development of synthetic paper at

Oji-Yuka Synthetic Paper Co., Ltd. since 1969;

3. I am an inventor of the following U.S. Patents: U.S. Patent Nos.  
4,097,645; 4,340,639; 4,341,880; 4,418,112; 4,420,530; 4,472,227; 4,483,965; 4,663,216;  
4,705,719; 4,795,676; 4,986,866; 5,254,302; 5,332,542; 5,409,754 and 5,670,225 and the  
corresponding foreign patents such as Japanese and European patents.

4. The experimentation outlined in the present U.S. application, the results  
thereof being documented on tables 1 and 2 therein; the experiments in the Declaration filed  
October 22, 1999 the results documented therein; the experiments in the Supplemental

Declaration filed April 9, 2001 the results documented therein; the experiments in the Second Supplemental Declaration filed August 5, 2002 the results documented therein; and the experiments in the Third Supplemental Declaration filed May 29, 2003 the results documented therein were carried out with my involvement, direction and supervision.

5. The following additional Experiments 1 and 2, the results presented in accompanying Tables 1-2, was also carried out with my involvement, direction and supervision and represents a "side-by-side" comparison of the claimed synthetic paper with one of Takashi et al. synthetic paper where the sole difference is the kind and amount of antistatic agent:

### **EXPERIMENT 1**

1) Manufacture of a base layer (Composition (polypropylene: 80 parts by weight, polyamide: 20 parts by weight, diatomaceous earth: 0.5 part by weight, and dispersing agent: 0.1 part by weight) is based on the description in Table I (b) in the invention of Takashi et al.)

A duplicate experiment was made on Example 12 of U.S. Patent No. 4,318,950 (invention made by the parent company of Oji-Yuka Synthetic Paper Co., Ltd., which is one of the present assignees (This technique has been transferred to Oji-Yuka Synthetic Paper Co., Ltd.)).

A resin composition (A) comprising 80 parts by weight of NOVATEC PP MA-8 (polypropylene produced by Japan Polychem Corporation; melting point: 164°C), 20 parts by weight of polyamide (Nylon 6, UBE Nylon 1022 FDX23), manufactured by UBE Industries, Ltd., 0.5 parts by weight of diatomaceous earth, 0.1 parts by weight of NYMEEN S-210



(dispersant produced by NOF Corp.) was melt-kneaded through an extruder, and then extruded through a die into a sheet at a temperature of 250°C. The sheet thus formed was cooled to a temperature of about 50°C.

Subsequently, the sheet was heated to a temperature of about 145°C and this sheet was stretched by the machine 5 times using a peripheral velocity of rolls to obtain a machine-directionally stretched film. The machine-directional stretching conditions based on the description in Table III in the invention of Takashi et al. were used.

Separately, a resin composition (B) comprising 80 parts by weight of NOVATEC PP MA-8 (polypropylene produced by Japan Polychem Corporation; melting point: 165°C), 20 parts by weight of polyamide (UBE Nylon 1022FDX23 – manufactured by Engelhard Minerals & Chemicals Co.), 80 parts by weight of clay having a particle diameter of 1 µm produced by ENGELHARD MINERALS & CHEMICALS CO., 0.7 parts by weight of low molecular weight antistatic agent (PHOSPHANOL RL-20<sup>1</sup>), 0.5 parts by weight of NYMEEN S-210 (dispersant produced by NOF Corp.) was separately melt-kneaded through two extruders, and then through a die to produce a film on both surfaces of the machine-directionally stretched base film and then laminated (B/A/B) to form a laminate (paper-like layer/base layer/paper-like layer).

The three-layer film (B/A/B) was introduced into a tenter oven where it was then heated to a temperature of 160°C. The film was then oriented crosswise by a factor of 7 at a temperature

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<sup>1</sup> Trade name has been changed from SM-1, manufactured by Toho Chemical Industry Co., Ltd because the low molecular weight antistatic agent "RE SISTAT PE 132" used in Ex. 12 of U.S. Patent 4,318,950 has been discontinued and the low molecular weight antistatic agent used in Ex. 1 of U.S. Patent 4,318,950 was used instead.

of 140°C using the tenter. It is noted that the transverse directional stretching conditions are based on the description in Table III in the invention of Takashi et al. Subsequently, the stretched film was subjected to corona discharge treatment at 70 W/m<sup>2</sup>/min on the side of the paper-like layer (B layer), cooled to a temperature of 55°C, and trimmed. The thickness of the three-layer stretched film was 140μm and the thickness of the individual layer (B/A/B) of the three-layer stretched film was 140μm and the thickness of the individual layers (B/A/B) of the three-layer stretched film were 50μm/40μm/50μm (The thickness are based on the description in Table IV in the invention of Takashi et al.). The synthetic film thus obtained has a three-layer structure and is a composite film containing a biaxially oriented stretched base layer and two uniaxially oriented stretched paper-like layers (surface layers).

## **EXPERIMENT 2**

A three-layered composite film structure containing a biaxially-oriented stretched base layer and two uniaxially-oriented paper-like surface layers was prepared in the same manner as in Experiment 1 above, except instead of PHOSPHANOL RL-20, (produced by TOHO Chemical Inc.) was changed to a high-molecular weight antistatic agent (polyethersteramide used in Example 1 of the present invention. The results are set forth in tables 1 and 2 and further discussed after the description of experiment 4.

## **EXPERIMENT 3**

A three-layered composite film structure containing a biaxially-oriented stretched base layer and two uniaxially-oriented paper-like surface layers was prepared in the same manner as in Experiment 1 above, except instead of using the low molecular weight antistatic agent at 0.7

parts by weight, 20 parts by weight was used. In addition, after laminating the paper-like layer to the base layer, the low molecular weight antistatic agent was bled out from the paper-like layer and the surface tackiness was generated on a forming roll.

It was noted that the antistatic agent that bled out of the paper-like layer causing tackiness on the forming roll was very difficult to handle. In fact the handling was so difficult that the synthetic paper could not be manufactured.

As with Experiment 2, the results are set forth in tables 1 and 2 and are discussed after the description of Experiment 4.

#### **EXPERIMENT 4**

A three-layered composite film structure containing a biaxially-oriented stretched base layer and two-uniaxially oriented paper-like surface layers was prepared as in Example 1 of the present invention. The procedure directly follows and the results are discussed below:

(1) Into a mixture of 80 wt% polypropylene having an MFR of 0.8 g/10 min, a melting point of 164°C (DSC peak temperature), and a degree of crystallinity of 67% (manufactured by Mitsubishi Chemical Corp.) and 8 wt% high-density polyethylene (manufactured by Mitsubishi Chemical Corp.) was incorporated 12 wt % calcium carbonate having an average particle diameter of 1.5  $\mu\text{m}$ . The resulting composition (I) was melt-kneaded with an extruder set at 270°C, subsequently extruded into a film, and then cooled with a cooler to obtain an unstretched film. After being heated to 140°C, this film was stretched in the machine direction 5 times.

(2) Using a Henschel mixer, 54 wt % polyetherester-amide [B1] obtained in Production Example 1 was mixed for 3 minutes with 18 wt % polyamide resin (UBE Nylon 1013B manufactured by UBE Industries, Inc.), 18 wt % acid-modified low-molecular weight polypropylene having an MFR of 4 g/10 min (manufactured by Mitsubishi Chemical Corp.). The resulting mixture was kneaded with a vented twin-screw extruder set at 240°C, extruded into strands with a die, and then cut to obtain a master batch [M] in a pellet form.

(3) Polypropylene having an MFR of 4 g/10 min, a melting point of 164°C, and a degree of crystallinity of 64% (manufactured by Mitsubishi Chemical Corp.) was mixed in an amount of 38 wt% with 40 wt% calcium carbonate having an average particle diameter of 0.8 $\mu$ m, and 17 wt % master batch [M], containing a permanent antistatic agent and obtained in (2) above. The resulting composition (III) was melt-kneaded with an extruder and then stretched film having a stretching ratio of 5 obtained in (1) above.

This three-layer laminate was heated to 155°C, and then stretched in the transverse direction 8 times with a tenter-stretching machine to obtain a stretched film. Subsequently, the stretched film was treated with 50 W/m<sup>2</sup> min corona discharge using a discharge device manufactured by Kasuga Denki Co., Ltd. to obtain a three-layer stretched film.

The thickness of the individual layers ( (III)/(I)/(II) ) of this three-layer stretched film was 20  $\mu$ m/60  $\mu$ m/20  $\mu$ m.

## Results

The resulting papers produced in Experiments 1-4 were evaluated according to the

evaluation methods of synthetic papers of the present invention. Namely, (1) surface resistivities of the synthetic papers resulting from each experiment were evaluated before and after washing with water and the results are set forth in Table 1 attached herewith. Also evaluated was (2) ink adhesion and suitable for paper feeding/discharge as the offset printability were also evaluated. The results are set forth in Table 2 attached herewith.

### Surface Resistivity ( $\Omega$ )

Experiment 1: The surface resistivity of the synthetic paper containing 0.7 parts by weight of low molecular weight antistatic agent as in Experiment 1 was  $2 \times 10^{13} \Omega$  before washing with water and  $1 \times 10^{16} \Omega$  after washing with water. The surface resistivity before washing was somewhat unproned but deteriorated after it was washed with water. This was because the low molecular weight antistatic agent on the surface of the synthetic paper was washed out

Experiment 2: The surface resistivity of the synthetic paper containing 0.7 parts by weight of high molecular weight antistatic agent was measured at  $2 \times 10^{14} \Omega$  before washing and  $2 \times 10^{14} \Omega$  after washing. Thus, the surface resistivity of the synthetic paper of Experiment 2 did not change indicating that the high molecular antistatic agent was not washed off in water.

Experiment 3: The surface resistivity of the synthetic paper prepared according to the procedure of Experiment 3 was  $1 \times 10^{18} \Omega$  before washing with water, which was somewhat unproned, but was  $5 \times 10^{15} \Omega$  after washing with water indicating at least part of the low molecular weight antistatic agent was washed out.

Experiment 4: Finally, the surface resistivity produced according to procedure of Experiment 4 was  $4 \times 10^{11} \Omega$  before washing with water and was  $3 \times 10^{11} \Omega$  after washing with water. Thus, indicating that the amount of antistatic agent wash off was very minimal, if any.

### Offset Printability (Ink Adhesion)

Experiment 1: The ink adhesion of the synthetic paper produced according to Experiment 1 was evaluated as "Δ", which was a level to become at least partially problematic. The suitability for paper feeding/discharge was evaluated and reported in table 2. An "x" in table 2 indicates that the paper was not suitable and would probably cause a high frequency of paper feeding/discharge trouble.

Experiment 2: Evaluation of the ink adhesion on the synthetic paper of Experiment 2 was indicated as "Δ" in table 2, which was a level to become practically problematic. As with the product produced in Experiment 1, the experiment 2 product also would probably cause a high frequency of feeding/discharge trouble as indicated in Table 2.

Experiment 3: Evaluation of the ink adhesion on the synthetic paper of Experiment 3 was also "Δ" at a level that would become practically problematic. As with Experiments 1 and 2 the "x" rating in Table 2 indicates because of high resistivity, which was a level to become problematic because of high frequency of paper feeding/discharge trouble.

Experiment 4: Unlike the synthetic papers produced according to Experiments 1-3, the synthetic paper produced according to Experiment 4 had favorable evaluations, as indicated by "⊕" in Table 2, for both ink adhesion on the synthetic paper and for paper feeding /discharge.

In other words, the ink adhesion on the synthetic paper produced according the experiment 4 would NOT become practically problematic and there would not be a high frequency of paper feeding/discharge trouble because of a high surface resistivity. Thus, the synthetic paper of Experiments 1-3 are practically unacceptable, where the synthetic paper of experiment 4, which was produced according to Example 1 of the present application, is far more superior and therefore is practically acceptable for the market.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

July 31, 2006  
Date

Masaaki Yamanaka  
Masaaki Yamanaka

**Table 1**

Components: Paper-like Layer								
	Resin	Parts	Filler	Parts	Anti-static Agent	Parts	Dispersing Agent	Parts
Ex. 1	PP**1	80	clay	80	PHOSPANOL SM-1	0.7	NYMEEN S-210	0.5
	Polyamide	20						
Ex. 2	PP**2	80	clay	80	PEEA	0.7	NYMEEN S-210	0.5
	Polyamide	20						
Ex. 3	PP**3	80	clay	80	PHOSPANOL SM-1	20	NYMEEN S-210	0.5
	Polyamide	20						
Ex. 4	PP**1	72.3	CaCO <sub>3</sub>	72.7	PEEA	16.7		
	Polyamide	5.5	TiO <sub>2</sub>	9.1				
	Modified PP	5.5						
Components: Base Layer								
	Resin	Parts	Filler	Parts	Anti-static Agent	Parts	Dispersing Agent	Parts
Ex. 1	PP**1	80	Kiesel-	0.5			NYMEEN S-210	0.1
	Polyamide	20	Guhr					
Ex. 2	PP**1	80	Kiesel-	0.5			NYMEEN S-210	0.1
	Polyamide	20	Guhr					
Ex. 3	PP**1	80	Kiesel-	0.5			NYMEEN S-210	0.1
	Polyamide	20	Guhr					
Ex. 4	PP**1	80	CaCO <sub>3</sub>	12				
	PE	8						

- \*\*1: (In Exs. 1 to 3, the amounts of the components are expressed in terms of parts by weight)
- \*\*2: (In Ex. 4, the amounts of the resins added (inclusive of PEEA) are expressed in terms of % by weight.)
- \*\*3: (In Ex. 4, the amounts of the fillers added are expressed in terms of parts by weight based on 100 parts by weight of resins inclusive of PEEA.)
- \*\*4: (In Ex. 4, the amounts of the components added are expressed in terms of % by weight)



PP\*1: Polypropylene, "Novatec PP, MA-8" (trade name), manufactured by Japan Polypropylene Corporation

PP\*2: Polypropylene, "Novatec PP, MA-3" (trade name), manufactured by Japan Polypropylene Corporation

Polyamide: Nylon 6, "UBE Nylon 1022FDX23" (trade name), manufactured by Ube Industries, Ltd.

PE: Polyethylene, "Novatec IID, HJ580" (trade name), manufactured by Japan Polyethylene Corporation

CaCO<sub>3</sub>: "Softon 1800" (trade name), manufactured by Shiraishi Calcium Kaisha Ltd.

TiO<sub>2</sub>: "CR-60" (trade name), manufactured by Ishihara Sangyo Co., Ltd.

PHOSPHANOL SM-1: "PHOSPHANOL RL-210" (trade name has been changed), manufactured by Toho chemical Industry Co., Ltd.

NYMEENS-210: manufactured by NOF Corporation

PEEA: polyetheresteramide of Production Example 1 of the present application

Modified PP: Acid-modified polypropylene of Production Example 3 of the present application

**Table 2**

	Stretching/Surface Treatment				Evaluation			
	Thickness ( $\mu\text{m}$ )	Stretching of paper-like layer		Surface Treatment	Surface resistivity ( $\Omega$ )		Offset printability	
	Front/core/back	Stretching	Stretching ratio		(a)	(b)	Ink adhesion	Suitability for paper feeding/discharge
Ex. 1	50/40/50	uniaxial	7	Corona	$2 \times 10^{13}$	$1 \times 10^{16}$	$\Delta$	x
Ex. 2	50/40/50	uniaxial	7	Corona	$2 \times 10^{13}$	$2 \times 10^{14}$	$\Delta$	x
Ex. 3	50/40/50	uniaxial	7	Corona	$1 \times 10^{13}$	$5 \times 10^{16}$	$\Delta$	x
Ex. 4	20/50/20	uniaxial	8	Corona	$4 \times 10^{11}$	$3 \times 10^{11}$	$\odot$	$\odot$

\*\*\*1

\*\*\*2

\*\*\*1: Before washing with water

\*\*\*2: After washing with water

## **RELATED PROCEEDINGS APPENDIX**

Appeal No. 2005-2639 regarding the above-referenced application 08/855,905 was mailed on December 1, 2005 in which a Request for Rehearing was filed and a subsequent Decision was mailed March 17, 2006 inviting the Applicants to file a new Declaration. Prosecution was continued by filing the Fourth Supplemental Declaration and a Request for Continued Examination (RCE). Copies of the Decision to Appeal No. 2005-2639 and the Decision on the Rehearing are attached herewith.



DOCKET

443-17

PAPER

Appeal to CAFC

DUE DATE

5/17

ATTORNEY

Jank (M)

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

## UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

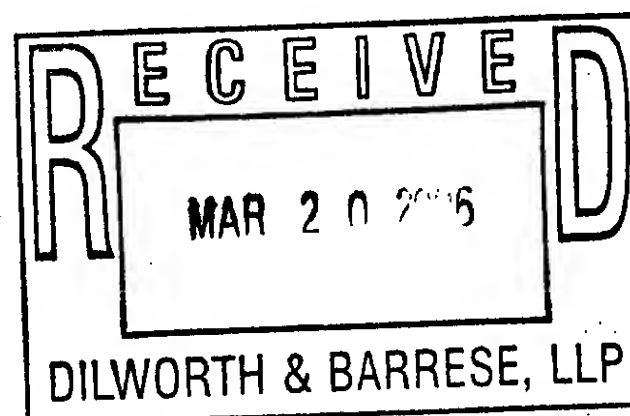
*Ex parte* MASAACKI YAMANAKA,  
HIROSHI KOYAMA and YASUHIRO UEDA

Appeal No. 2005-2639  
Application 08/855,905

ON BRIEF

MAILED

MAR 17 2006

U.S. PATENT AND TRADEMARK OFFICE  
BOARD OF PATENT APPEALS  
AND INTERFERENCES

Before KIMLIN, GARRIS and WARREN, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

*On Request For Rehearing*

This is a request for rehearing under 37 CFR § 41.52 (2005). Requests for rehearing must comply with 37 CFR § 41.52(a)(1) (2005) which specifies that "[t]he request for rehearing must state with particularity the points believed to have been misapprehended or overlooked by the Board." *See also* Manual of Patent Examining Procedure (MPEP) § 1214.03 (8th ed., Rev. 3, August 2005).

Appellants request rehearing of our decision entered December 16, 2005, affirming the examiner's rejection of appealed claims 1 and 28 through 49 under 35 U.S.C. § 103(a) as being unpatentable over Takashi in view of Ohba and Ueda (request, page 1). Appellants contend (1) that we failed to consider a three-layered synthetic paper specifically encompassed by appealed claim 47 and thus, improperly dismissed the experiments performed in the Yamanaka

III declaration, and (2) that we misinterpreted the Yamanaka III declaration on other grounds (*id.*, pages 2 and 3-4).

Appellants submit, with respect to their first contention, that we did not address the issue, raised in section II of the reply brief (page 2), that the examiner's statement that the comparison presented in the Yamanaka III declaration "does not agree in scope with the present claims because the claims do not require a 3-layered film" (answer, page 15) is contrary to claim 47 which specifies such a structure (request, page 2). Appellants further submit that the above statement of the examiner was preceded by the statement with respect to the evidence in the Yamanaka III declaration, that "[t]he inventive paper shows improvement with regard to antistatic properties and printability" (answer, page 15), which finding "cannot be dismissed since the experiments performed in this declaration agree with the scope of the invention, namely the three-layered film of Claim 47" (request, page 2; original emphasis deleted).

Appellants submit, with respect to their second contention, that we found "significant basic differences between [Takashi Example 12] and [Yamanaka III declaration] Experiments 1-3[,] . . . [i]n particular" our finding that "[t]he base layer of Takashi Example 12 contains an antistatic agent which was omitted in declaration III Examples 1-3, and the antistatic agent of the paper-like layer of Experiment 1 has been changed to a different type than used in Takashi Example 12" (request, page 3, quoting original decision, page 20). Appellants point out that "a review of table I (b) at columns 9-10 of [Takashi], which describes the base layer component of Experiment 12, does not, in fact, include an anti-static agent," and argue that Experiments 1-3 of Yamanaka III declaration are "in fact is consistent with Experiment 12" (request, page 3; original emphasis deleted). Appellants further point out that "the Yamanaka III declaration clearly states that the reason low molecular weight anti-static RESISTAT PE 132 of [Takashi] was not used in the numerated experiments was because it was no longer available" and a different antistatic was used (request, page 3; original emphasis deleted).

Our consideration of the Yamanaka III declaration did not turn solely on either of the grounds raised by appellants in their request (original decision, pages 20-21). Indeed, we found

significant basic differences between the ingredients and processing conditions used in the base and paper-like layers of the synthetic papers of Experiments 1-3 (*see* Takashi Tables I(b), II(b), III and IV, and declaration III Tables 1 and 2) and the synthetic paper

of “Example 1 of the Present Application” in Experiment 4 (*see* specification pages 29-31 and Table 1, page 36, and declaration III Table 2). These include, among others, the kind and amount of “Resin” (e.g., polyamide in Takashi Experiments and polyethylene in the claimed Experiment), the kind and amount of fine inorganic particulate filler, the thicknesses of the individual layers and the stretching ratios. [Original decision, page 20; underline emphasis supplied.]

The portion of our original decision quoted by appellants (request, page 3) immediately followed this passage. With respect to the use of a different antistatic agent, appellants’ selected quote omits the concluding phrase “as declarant Yamanaka explains (page 2),” which explanation at page 2 of the Yamanaka III declaration is the same as that set forth by appellants in the request (original decision, page 20). Appellants do not refer in their request to either this finding or our further finding in these respects that “[t]he antistatic agent used in paper-like layers of Experiments 2 and 3 is the polyetheresteramide used in specification Example 1 but in significantly reduced amounts and without a polyamide or a modified low-molecular weight polypropylene” (original decision, page 20).

We agree with appellants’ second contention to the extent that we erroneously found that Takashi Example 12 included an antistatic agent. However, it is apparent that the remaining considerable number of differences we found between the compared films provide substantial evidence supporting our conclusion that the Yamanaka III declaration does not present a side-by-side comparison wherein the sole difference is in the kind and amount of antistatic agent, which is the thrust of the ground of rejection, and thus, the evidence does not establish that the reported results would have been unexpected by one of ordinary skill in this art in view of the teachings of the applied references (original decision, page 21).

In view of our findings with respect to the evidence in the Yamanaka III declaration, we found it unnecessary to our original decision to consider whether the evidence was commensurate in scope with the claims, including appealed claim 47, and find it unnecessary to do so on rehearing.

Accordingly, we grant appellants’ request to the extent that we have reheard our original decision entered December 16, 2005, and we modify our original decision by withdrawing the language “base layer of Takashi Example 12 contains an antistatic agent which was omitted in

declaration III Experiments 1-3, and the” from the penultimate sentence in the sole full paragraph on page 20 thereof.

We determined above that this matter does not change our consideration of the evidence in the Yamanaka III declaration, and accordingly, our so modified original decision does not become, in effect, a new decision. A second request for rehearing will not be permitted. 37 CFR § 41.52(a)(1) (2005).

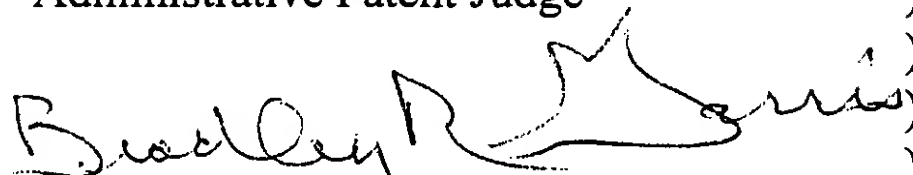
This decision on appellants’ request for rehearing is deemed to incorporate our original decision on appeal, except for the portion specifically withdrawn above, and is final for the purposes of judicial review. 37 CFR § 41.52(a)(1) (2005).

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv) (2005).

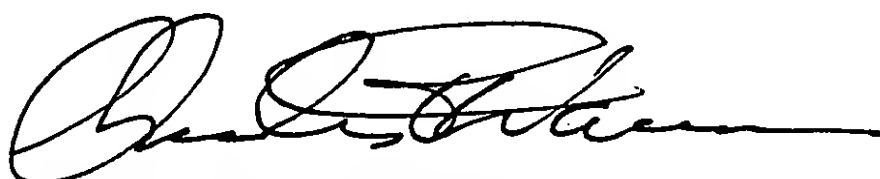
*GRANTED-IN-PART*



EDWARD C. KIMLIN  
Administrative Patent Judge



BRADLEY R. GARRIS  
Administrative Patent Judge



CHARLES F. WARREN  
Administrative Patent Judge

BOARD OF PATENT  
APPEALS AND  
INTERFERENCES



Appeal No. 2005-2639  
Application 08/855,905

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443-17

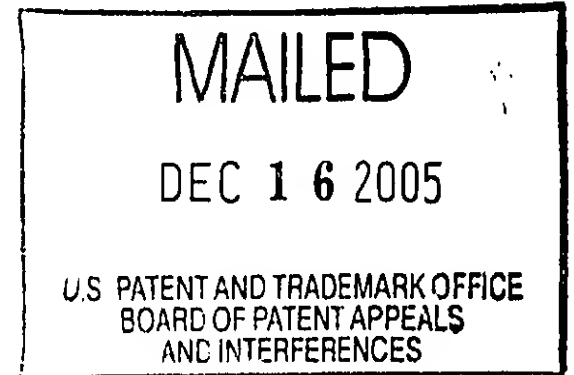


The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

*Ex parte* MASA AKI YAMANAKA,  
HIROSHI KOYAMA and YASUHIRO UEDA



DOCKET

443-17

PAPER

Req for Rehearing,  
Appeal to CAFC or RCE

DUE DATE

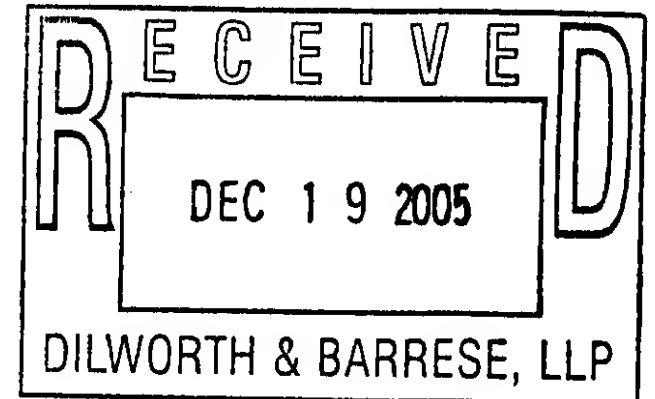
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ATTORNEY

gma (u)

Appeal No. 2005-2639  
Application 08/855,905

ON BRIEF



Before KIMLIN, GARRIS and WARREN, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

*Decision on Appeal*

This is an appeal under 35 U.S.C. § 134 from the decision of the examiner finally rejecting claims 1 and 28 through 49, all of the claims in the application.

Claim 1 illustrates appellants' invention of a synthetic paper, and is representative of the claims on appeal:<sup>1</sup>

1. A synthetic paper which comprises a film obtained by oxidizing the surface of a film obtained by stretching a resin film comprising as the base material a resin composition comprising

100 parts by weight of resin components and from 10 to 250 parts by weight of component E: fine inorganic particles;

said resin components comprising, based on the total weight of the resin components;

<sup>1</sup> We have reproduced claim 1 as it stands of record as of the amendment filed November 14, 2003.

55-90 wt% of component A: a polypropylene resin,

5-40 wt% of component B: a polyetheresteramide containing aromatic rings which is derived from

component b1: a polyamide having a number-average molecular weight of from 200 to 5,000 and containing a carboxyl group at each end, and

component b2: an alkylene oxide adduct of bisphenol having a number-average molecular weight of from 300 to 5,000,

3-20 wt% of component C: a polyamide resin, and

1-20 wt% of component D: at least one modified low-molecular weight polypropylene selected from the group consisting of

component d1: an acid-modified low-molecular weight polypropylene having a number-average molecular weight of from 800 to 25,000 and an acid value of from 5 to 150,

component d2: a hydroxy-modified low-molecular weight polypropylene having a number-average molecular weight of from 800 to 25,000 and a hydroxyl value of from 5 to 150, and

component d3: an ester-modified low-molecular weight polypropylene obtained by partly or wholly esterifying component d1 with a polyoxyalkylene compound and having a number-average molecular weight of from 1,000 to 28,000;

said stretching being conducted at a temperature lower than the melting point of the propylene resin as component A, said stretching and oxidation of said stretched film generating ultrafine cracks on a surface of said stretched film through which component B as permanent antistatic agent appears and possessing gloss of from 15 to 60% and opaqueness of from 83 to 96%.

The references relied on by the examiner are:

Takashi et al. (Takashi)	4,318,950	Mar. 9, 1982
Ohba et al. (Ohba)	5,233,924	Aug. 10, 1993
Ueda et al. (Ueda)	0 613 919	Sep. 7, 1994
(published European Patent Application)		

The examiner has rejected appealed claims 1 and 28 through 49 under 35 U.S.C. § 103(a) as being unpatentable over Takashi in view of Ohba and Ueda (answer, pages 3-7).

Appellants argue independent claims 1, 28 and 29 as a group and present further argument with respect to claims 30 through 34, 38 and 46 through 49. Thus, we decide this appeal based on claim 1 as representative of the appealed claims except claims 30 through 34, 38 and 46 through 49 to the extent argued in the brief and reply brief. 37 CFR § 41.37(c)(1)(vii) (September 2004).

We affirm.

Rather than reiterate the respective positions advanced by the examiner and appellants, we refer to the answer and to the brief<sup>2</sup> and reply brief for a complete exposition thereof.

*Opinion*

We have carefully reviewed the record on this appeal and based thereon find ourselves in agreement with the supported position advanced by the examiner that, *prima facie*, the claimed etch chamber encompassed by appealed claims 1, 30 through 34, 38 and 46 through 49 would have been obvious over the combined teachings of Takashi, Ohba and Ueda to one of ordinary skill in this art at the time the claimed invention was made. Accordingly, since a *prima facie* case of obviousness has been established, we again evaluate all of the evidence of obviousness and nonobviousness based on the record as a whole, giving due consideration to the weight of appellants' arguments in the brief and reply brief, and the objective evidence in the specification and in the four declarations under 37 CFR § 1.132 of appellant Yamanaka<sup>3</sup> to the extent relied on in the brief and reply brief. *See generally, In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984).

As an initial matter, we interpret claim 1 by giving the terms thereof the broadest reasonable interpretation in their ordinary usage as they would be understood by one of ordinary skill in the art in light of the written description in the specification, unless another meaning is intended by appellants as established in the written description of the specification, and without reading into the claims any limitation or particular embodiment disclosed in the specification. *See, e.g., In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364, 70 USPQ2d 1827, 1830 (Fed. Cir. 2004); *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Zletz*, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989). The plain language of

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<sup>2</sup> We consider the brief filed October 27, 2004. See the communication filed February 10, 2005.

<sup>3</sup> Yamanaka Declaration, executed October 6, 1999, filed October 22, 1999 (Yamanaka I declaration); Yamanaka Supplemental Declaration, executed March 22, 2001, filed April 9, 2001 (Yamanaka II declaration); Yamanaka Second Supplemental Declaration, executed July 12, 2002, filed August 5, 2002 (Yamanaka III declaration); and Yamanaka Third Supplemental Declaration, executed May 19, 2003, filed May 29, 2003 (Yamanaka IV declaration).

claim 1 encompasses a synthetic paper which comprises at least one polypropylene resin film that is stretched in any manner at a temperature lower than the melting point of the polypropylene resin used in the film and oxidized in any manner, wherein the oxidation and stretching generate ultrafine cracks on the surface of the film through which the permanent antistatic agent appears, and has a gloss and an opaqueness in the specified ranges. The at least one polypropylene resin film comprises at least component E, which is fine inorganic particles in the specified parts by weight range, as well as a base polypropylene resin composition that comprises at least resin components A through D, in the specified parts by weight ranges. The resin components further comprise at least any polypropylene resin as component A; a polyetheresteramide containing aromatic groups as the permanent antistatic agent component B, wherein the polyetheresteramide is derived in any manner from any polyamide with a carboxyl group at each end, designated component b1, and any alkylene oxide adduct of any bisphenol, designated component b2; any polyamide as component C; and at least one low-molecular weight polypropylene as component D selected from the group consisting of polypropylene that has been acid-modified by any manner of acid, designated component d1, hydroxy-modified, designated as component d2, and ester-modified by any manner of ester, designated component d3.

The open-ended term “comprising,” used in transition and in the body of the claim, opens the claim to include synthetic paper which contains any manner of additional components in the polypropylene resin film, including additional components in the polypropylene resin composition, as well as any manner of layers in addition to the polypropylene resin film. In this respect, appellants disclose in the written description in the specification, for example, that the polypropylene resin composition can contain additional components, such as other olefins in component A, and additives, such as surfactants (e.g., pages 7 and 20), and can be laminated to other films (e.g., pages 22-23). *See generally, Genentech Inc. v. Chiron Corp.*, 112 F.3d 495, 501, 42 USPQ2d 1608, 1613 (Fed. Cir. 1997), citing *In re Baxter*, 656 F.2d 679, 686, 210 USPQ 795, 802 (CCPA 1981; *Exxon Chem. Pats., Inc. v. Lubrizol Corp.*, 64 F.3d 1553, 1555, 35 USPQ2d 1801, 1802 (Fed. Cir. 1995) (“The claimed composition is defined as comprising - meaning containing at least - five specific ingredients.”); *Baxter*, 656 F.2d at 686-87, 210 USPQ at 802-03 (CCPA 1981) (“As long as one of the monomers in the reaction is propylene, any other

monomer may be present, because the term 'comprises' permits the *inclusion* of other steps, elements, or materials.").

We find that Takashi would have acknowledged that it was known in the art to prepare synthetic papers from thermoplastic resin film which is oriented or stretched under elevated temperatures, contains filler and can be one layer of a laminate (col. 1). Takashi would have disclosed to one of ordinary skill in this art a laminated synthetic paper for writing and printing having a base film layer and a paper-like film layer on at least one side of the base film layer. The base film layer is a thermoplastic resin film which contains fine inorganic particulate filler and is biaxially stretched or oriented. The paper-like film layer is a thermoplastic resin film which can contain up to 65 weight percent of fine inorganic particulate filler and is uniaxially stretched or oriented at elevated temperatures. The filler and the stretching or orientation creates open cells or microvoids open to the surface and elongated microvoids distributed within the film, "with fibrous-like portions of the resin among the microvoids to define a cellular, fibrous structure," which determines the gloss and opaqueness of the film. The surface of the paper-like resin film layer is polarized, that is, oxidized, by a corona discharge treatment to improve ink adhesion during printing. The base film layer can be a polyolefin resin, including polyethylene, polypropylene and mixtures thereof, and contains additional ingredients, including the filler. The paper-like film layer can be the same resins and contains the filler as well as additional ingredients including stabilizers, dispersing agents and antistatic agents, wherein the antistatic agents can be present in the amounts of about 0.1 to about 1.5 weight percent of the film composition. The manufacturing conditions, including extruder molding and stretching temperatures, for the exemplified synthetic papers, including polypropylene and polypropylene/polyethylene base film and paper-like film layers, are set forth in Table III. The properties of the exemplified films and the effect of filler content thereon, including gloss and opaqueness within the ranges of 15 to 60% and 83 to 96%, respectfully, are set forth in Tables V, VII(a) and VII(b). The synthetic paper can be used for, among others, "high grade printing paper." See, e.g., col. 2, ll. 20-64, col. 3, l. 31, to col. 8, l. 27, Tables I(a) through VII(b), col. 17, ll. 31-36, and col. 18, l. 52, to col. 19, l. 25.

We find no disclosure of “ultrafine cracks” in Takashi. However, Ohba acknowledges that Takashi would have disclosed “[a] synthetic paper obtained by stretching a polypropylene film containing from 8 to 65% by weight of an inorganic fine powder,” and that “[s]ynthetic paper of this type have a microstructure in which fine voids are formed around inorganic fine powder and a vast number of streaking cracks are formed on the surface . . . [and] is not only lightweight but has excellent printing ink receptivity, pencil writability, water resistance, etc.” (col. 1, ll. 15-30). We note that Takashi, Ohba and the present application are commonly assigned. *See* brief (page 1) and Yamanaka I declaration (¶ 5., page 2, second paragraph).

We find that Ueda would have disclosed a particular class of “polyetheresteramide with high heat resistance, permanently antistatic property and superior compatibility with thermoplastic resins” compared with other polyetheresteramides, wherein “[t]he polyetheresteramide . . . consists essentially of the two components of a polyamide oligomer with carboxylic chain ends . . . and a bisphenol compound with oxyalkylene units,” the number-average molecular weight range of the polyamide being the same as specified in appealed claim 1 while that of the alkylene oxide adduct of bisphenol falls within that specified in appealed claim 1. Ueda would have taught that compatibility of the polyetheresteramide with thermoplastic resins, of which polypropylene is preferred, can be improved with acid modified, hydroxy-modified and ester-modified vinyl polymers, including low-molecular weight polypropylene. The reference further would have taught that the “polyetheresteramide is poor in surface orientation” in crystalline polyolefin resins, such as polypropylene, which “can be improved” by the use of a polyamide resin with “the desired antistatic property being effected with a small amount of polyetheresteramide.” The reference would have disclosed that compositions can contain thermoplastic resin in the amount of 60 to 97% of the weight of the polyetheresteramide, and compatibilizers can be up to 40% by weight of the resin and the polyetheresteramide. Preferred composition 2 comprises a polyolefin, a polyetheresteramide, a polyamide resin and a compatibilizer in amounts that encompass the ranges for corresponding components A through D of appealed claim 1. The compositions can be prepared by extrusion and can contain additives such as fillers and surfactants. The exemplified compositions were tested by measuring the surface resistivity of unwashed and water washed pieces prepared by injection molding,

establishing that the polyetheresteramide antistatic agent is “permanent” as it does not wash out. See, e.g., abstract, page 2, ll. 3-56, page 3, l. 3, to page 5, l. 57, page 7, l. 21, to page 8, l. 9, page 8, ll. 50-56, pages 9-10, and page 11, ll. 7-24.

We further find that appellants acknowledge that it was known that antistatic properties of synthetic papers containing polypropylene films, such as those of Takashi, must be improved for purposes of paper feeding and discharge from a printer and “to be printable by gravure printing, offset printing, flexography, etc.,” and that the use in such paper of “low-molecular weight antistatic agents of the kneading type, e.g., sorbitan monooleate or glycerol monostearate” has the “drawback that the antistatic properties do not last for long and there is a desire in the market for an improvement in this respect” (specification, pages 1-2).

The examiner submits that Takashi “does not teach the claimed antistatic composition” but Ueda does, and that one of ordinary skill in the art would have used the polyetheresteramide of Ueda in the synthetic polypropylene papers of Takashi because, as disclosed by Ueda, the polyetheresteramide is known to be compatible with polypropylene, heat [resistant], maintains . . . antistatic properties permanently . . . and does not rinse away in the presence of water” when used in amounts “sufficient for providing polypropylene matrixes with antistatic properties” (answer, pages 3-5). The examiner further submits that one of ordinary skill in the art would have used sufficient amounts of polyamide in order to increase the surface orientation of the polyetheresteramide, and of compatibilizers as taught by Ueda (*id.*, pages 5-7).

Appellants argue that the applied prior art does not suggest the claimed synthetic paper and its offset printing properties and antistatic properties, pointing out that Ueda does not disclose a stretched film having such properties (brief, pages 5-6). Appellants alleges that “ink adhesion property during offset printing is poor” without the “claimed antistatic resin” and without “inorganic filler,” as shown in specification Comparative Examples 1 and 2, respectively, and that without “stretching,” the “surface resistivity, ink adhesion and . . . paper feeding/discharge are all poor,” as shown in specification Comparative Example 3, whereas the specification claimed examples “exhibit both excellent permanent antistatic properties and offset printability” (*id.*, page 6). Appellants further submit, in this respect, that Ueda does not suggest that orienting or stretching a film of antistatic agent containing olefin resin will provide



“enhanced antistatic effect” or “disclose evaluation of offset printability” of such film (*id.*, page 7). According to appellants, specification Comparative Examples 2 and 3 show that orienting or stretching decreases surface resistivity even if the claimed antistatic agent is used, thus establishing that “the surprising benefit of orienting on antistatic properties has been discovered for the very first time by the present invention” (*id.*). Appellants further point out that Takashi discloses that a low-molecular weight antistatic agent can be used in the amount of “only from 0.1 to 1.0 parts by weight” while the claimed high-molecular weight permanent antistatic agent is used at “5 to 40% by weight based on the weight of the resin component,” providing results unexpected from the references (*id.*, pages 7-8; original emphasis deleted).

Appellants still further submit that “it is not obvious to use the filler and processing taught in [Takashi] with the polymer and antistatic compound taught in [Ueda]” (*id.*, page 8). Appellants contend that Ueda uses resin compositions containing the polyetheresteramide to injection mold solid articles in which the surface is “rich” in the antistatic agent because of the polyamide, whereas the claimed film is stretched, thus orienting the antistatic agent to improve resistivity, which is a different mechanism (*id.*, page 9). Appellants further point out that the molded articles of Ueda contain no filler, and thus no voids, and therefore “the molded articles are transparent or translucent” (*id.*, original emphasis deleted). Appellants contend that Experiment 5 in the Yamanaka III declaration, which is based on using the composition of Ueda Example 43 to form a film “under the conditions of” Takashi, establishes that a “biaxially stretch film could not be obtained because the sheet broke” in the stretching machine “because polypropylene (PP) of grade suitable for injection molding has MFR of 9g/min., high flowing property and low melting tension” (*id.*, pages 9-10; original emphasis deleted).

Appellants submit the following with respect to the four Yamanaka declarations. Appellants contend that the Yamanaka I declaration establishes that when “0.3 parts” of “a low molecular weight antistatic agent” is used in a synthetic paper as taught by Takashi, the antistatic property “improved slightly” and “paper feeding/discharge in offset printing” was “poor,” and when “16.7 parts by weight based on the resin components” of the same agent was used in amounts within the appealed claims, “the rolls during film formation became tacky and film

formation was hence difficult” and upon washing, the surface resistivity of the film deteriorated because the antistatic agent “dissolved away” (*id.*, page 12).

Appellants contend that the Yamanaka II declaration was filed in view of the examiner’s findings that “there were too many variables in the comparative testing of the Yamanaka I declaration, with the proper comparison being to a synthetic paper of [Takashi] having a different antistatic agent from the claimed polyetheresteramide,” and that “for the Comparative Examples 2 and 3 of the present invention to comparatively show the effect of stretching, they should be conducted with respect to films which have undergone the same surface treatment” (*id.*, page 13). According to appellants, the results show that stretching “is essential for the effective development of antistatic properties,” the corona treatment does not effect surface resistivity and feeding/discharge properties, and “thus, the extrudate sheets obtained from the composition disclosed by [Ueda] had insufficient antistatic properties” (*id.*, pages 13-14; original emphasis deleted).

Appellants contend that the Yamanaka III declaration involves a comparison “between Example 12 of [Takashi] with both polyetheresteramide and other antistatic agent against the inventive paper,” wherein Experiment 1 is Takashi Example 12; Experiment 2 is Takashi Example 12 with “a polyetheresteramide antistatic agent;” Experiment 3 is Experiment 2 with “a much larger amount of 20 parts by weight” of the agent; and Experiment 4 is a claimed composition (*id.*, pages 14-15). According to appellants, only the claimed composition provides improved surface resistivity after washing with satisfactory printability (*id.*, page 15). Appellants again point out that Experiment 5 shows that it is “impossible” to prepare “a film comprising a composition taught by [Ueda] according to the processing conditions of [Takashi]” (*id.*).

Appellants contend that the Yamanaka IV declaration involves comparisons establishing the “improvement of the claimed invention over any possible combination of” Takashi and Ueda, wherein Experiments 1-4 prepare “different-layer films” with the composition of Takashi Example 12; Experiments 5-7 prepare “different-layer films” according to specification Example 1; and Experiment 8 involves “a three-layer film prepared according to [Takashi] but with a polyetheresteramide antistatic agent in large amounts” (*id.*, pages 15-16). According to appellants, the results show that only the “claimed invention (Experiment 7)” had good resistivity

and offset printability, and “a paper prepared according to [Takashi] and containing an antistatic agent of the type and amount of [Ueda] still fail to result in good resistivity and printability (Experiment 8)” (*id.*, page 16).

Appellants argue that the examiner’s finding that Experiment 2 of the Yamanaka IV declaration does not represent the combination of Takashi and Ueda because Ueda teaches that other components are present with the polyetheresteramide, is incorrect because Ueda is relied on for the polyetheresteramide and not the other components, pointing out that the examiner also found the showing that a composition of Ueda could not be used to prepare a film in the Yamanaka III and IV declarations to be unrepresentative of the prior art (*id.*). Appellants further argue that the claimed component b2 of the polyetheresteramide component B is present in the polyetheresteramide representing Ueda in the comparative compositions of the Yamanaka III and IV declarations (*id.*, pages 16-17).

The examiner responds that Takashi and not Ueda is relied on to establish that compositions containing antistatic agents are used in preparing stretched film for the offset printing arts (answer, page 7). The examiner finds that the results obtained with the specification Comparative Examples would have been expected by one of ordinary skill in this art because this person would have recognized that in Comparative Example 1, no anti-static agent will result in poor ink adhesion “[a]s noted by appellants on page 1 of the specification;” in Comparative Example 2, no inorganic filler would result in poor ink adhesion and offset printing as “Takashi teaches that the filler is necessary to create micro-voids that improve the ink adhesion properties;” and in Comparative 3, no stretching would result in the same poor properties as “Takashi teaches that the filler is necessary to orient a surface layer . . . to improve the ink adhesion properties” (*id.*, pages 8-9). The examiner finds the Yamanaka II declaration “insufficient to establish unexpected results because Appellants have not compared . . . the closest prior art” which “is an embodiment of Takashi that comprises an antistatic agent other than the claimed antistatic agent” (*id.*, pages 9-10; *see also* pages 14-15). Thus, the examiner considers appellants’ supported contention “that the effect of orienting the claimed composition decreases the surface resistivity of the resin composition . . . [is an] unexpected benefit of

orientation . . . previously unknown” to constitute recognition of “a latent property of the synthetic paper taught in Takashi” (*id.*).

The examiner submits that Ueda provides the motivation to use the combination of polyetheresteramides, polyamides and modified polypropylene and the amounts thereof in the polypropylene film of Takashi, arguing that teachings of Ueda are not limited to compositions for molded articles but encompass any resin composition containing the polyetheresteramide antistatic agent taught in the reference (*id.*, pages 10-12). The examiner further argues that Takashi, not Ueda, teaches polypropylene film contains filler and voids (*id.*, page 12). The examiner finds that Experiment 5 of the Yamanaka III declaration involves “a film that was attempted to be produced by using the composition of Ueda under the conditions of Takashi” wherein “a biaxially stretched film could not be obtained,” according to appellants, because of the particular polypropylene used to prepare the film (*id.*, pages 12-13; *see also* pages 15-16). The examiner takes the position that the showing is not based on the closest prior art because the rejection is based on Takashi and not on the biaxially orienting film obtained from a particular polypropylene resin taught in Ueda (*id.*, page 13).

The examiner appears to find that the two experiments in the Yamanaka I declaration show that the polypropylene film would have retained the polyetheresteramide component after washing which would have been expected by one of ordinary skill in the art from the teachings of Ueda (*id.*, page 14). The examiner finds that in the Yamanaka III declaration, three experiments are based on Takashi Example 12, two with polyetheresteramide component B and one with another antistatic agent, wherein the former two experiments do not include polyamide components C and modified low-molecular weight polypropylene component D with polyetheresteramide component B. According to the examiner, the showing that in comparison to a claimed polypropylene paper, each of the prior art polypropylene papers “has high surface resistivity after washing . . . is not unexpected in view of the teachings of Ueda . . . that a composition comprising components A-D will retain its antistatic properties after washing” and one of ordinary skill would “expect a sheet with high resistivity to exhibit poor offset printing” as disclosed by appellants on page 1 of the specification (*id.*, page 15). For the same reasons, the examiner finds that in the Yamanaka IV declaration, the differences in reported results between

polypropylene papers as claimed and according to the teachings of Takashi are not unexpected because of the difference in the presence and absence of components B, C and D, with respect to Experiments 1 through 7, and with respect to Experiment 8, the presence of component B without components C and D (*id.*, pages 16-17).

We find substantial evidence in the record supporting the examiner's position. Appellants acknowledge in the specification that the polypropylene film synthetic paper taught by Takashi to include an antistatic agent up to about 1.5 weight percent of the film composition, is deficient in antistatic static properties that affect the performance of the paper in the printer and in offset printing, which properties are exhibited on the surface of the polypropylene film. It is well settled that "[t]he significance of evidence that a problem was known in the prior art is, of course, that knowledge of a problem provides a reason or motivation for workers in the art to apply their skill to its solution." *In re Nomiya*, 509 F.2d 566, 574, 184 USPQ 607, 613 (CCPA 1975). Therefore, we are of the view that one of ordinary skill in this art would have considered other antistatic agents to address the known antistatic problem in the polypropylene synthetic papers of Takashi.

We agree with the examiner that one of ordinary skill in this art would have considered the particular class of polyetheresteramides of Ueda in view of the teachings therein that such compounds are heat resistant, permanent antistatic agents which can be combined with polyamides for surface orientation and with modified low-molecular polypropylenes for compatibility when used in thermoplastic resin compositions, preferably polypropylene resin compositions. Indeed, Ueda would have taught that the polyetheresteramide antistatic agents do not wash out of the surface of injection molded polypropylene articles, and that polypropylene compositions containing the polyetheresteramides, polyamides and modified low-molecular weight polypropylene can contain further ingredients including "fillers" and "surfactants," which are used in the polypropylene layers of the synthetic paper of Takashi, and can be extruded and molded at temperatures which are used in processing, including stretching, the polypropylene layers by Takashi. Ueda would have further disclosed preferred weight percent ranges for the resin components polypropylene, polyetheresteramide, polyamide and modified low-molecular weight polypropylene that fall within the corresponding ranges in the appealed claims.

Thus, *prima facie*, the combined teachings of Takashi, Ohba and Ueda would have reasonably suggested to one of ordinary skill in this art to modify the polypropylene synthetic papers taught by Takashi by using in place of the antistatic agents in the polypropylene resin compositions to form the layers disclosed in that reference, the polyetheresteramide permanent antistatic agents along with polyamides for surface orientation thereof and modified low-molecular weight modifiers as compatibilizers therefor taught by Ueda in the reasonable expectation of improving the antistatic properties of the resulting polypropylene synthetic papers with the permanent antistatic agent and thus, the paper handling and offset printing properties thereof. Furthermore, the amount of these ingredients used in the polypropylene resin compositions of Takashi would have been adjusted by one of ordinary skill in this art based on the teachings of Ueda to determine workable and optimum ranges to obtain the desired antistatic properties and thus, paper handling and offset printing properties. Accordingly, *prima facie*, one of ordinary skill in this art routinely following the combined teachings of the applied references would have reasonably arrived at the claimed polypropylene synthetic paper encompassed by appealed claim 1, including each and every limitation thereof arranged as required therein, without recourse to appellants' specification. See *In re Corkill*, 771 F.2d 1496, 1497-1500, 226 USPQ 1005, 1006-08 (Fed. Cir. 1985); *In re Longi*, 759 F.2d 887, 897, 225 USPQ 645, 651-52 (Fed. Cir. 1985); *In re Kerkhoven*, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980), and case cited therein; *In re Skoll*, 523 F.2d 1392, 1397-98, 187 USPQ 481, 484-85 (CCPA 1975); *In re Castner*, 518 F.2d 1234, 1238-39, 186 USPQ 213, 217 (CCPA 1975); *In re Lintner*, 458 F.2d 1013, 1015-16, 173 USPQ 560, 562-63 (CCPA 1972); see also *In re O'Farrell*, 853 F.2d 894, 903-04, 7 USPQ2d 1673, 1680-81 (Fed. Cir. 1988) ("Obviousness does not require absolute predictability of success. . . . There is always at least a possibility of unexpected results, that would then provide an objective basis for showing the invention, although apparently obvious, was in law nonobvious. [Citations omitted.] For obviousness under § 103, all that is required is a reasonable expectation of success. [Citations omitted.]"); *In re Dow Chem. Co.*, 837 F.2d 469, 473, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988) ("The consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that [the claimed process] should be carried out and would have a



reasonable likelihood of success viewed in light of the prior art. [Citations omitted] Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure."); *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981) ("The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art."); *In re Aller*, 220 F.2d 454, 456-58, 105 USPQ 233, 235-37 (CCPA 1955) ("[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.").

Therefore, the burden falls upon appellants to establish that the claimed polypropylene synthetic papers encompassed by claim 1 patentably distinguish over the teachings of the applied prior art with effective argument and/or objective evidence. We agree with the examiner that appellants have not carried their burden.

We agree with the examiner that contrary to appellants' arguments, the thrust of the rejection is that one of ordinary skill in the art would have modified the polypropylene synthetic paper of Takashi by using the three component antistatic composition of Ueda, and not that one of ordinary skill in this art would have applied the methods of forming a synthetic paper taught by Takashi to particular compositions of Ueda. This is because the sole difference between the polypropylene synthetic paper encompassed by appealed claim 1 and taught by Takashi is the polyetheresteramide antistatic agent and associated polyamides and modified low-molecular weight polypropylenes facilitating the effective use of the agent in polypropylene. Indeed, Takashi would have taught that a fine organic particulate filler containing polypropylene paper-like film is stretched to develop microvoids in and on the surface of the film and is oxidized by corona discharge treatment to further improve ink adhesion on the surface, forming ultrafine cracks on the surface as acknowledged by Ohba, the film possessing gloss and opaqueness, all as required by appealed claim 1.

We find no evidence in the applied prior art raising the issue of whether one of ordinary skill in this art would have considered combining the teachings thereof to form polypropylene

synthetic paper from illustrative polypropylene resin compositions disclosed by Ueda by using only the processing steps of Takashi, which appellants address. This is because the stretching processing steps of Takashi are based on the presence of fine organic particulate filler in the polypropylene resin compositions in the amounts taught in the reference to form the microvoids and to provide gloss and opaqueness, and such filler, while encompassed by the generic teaching of "filler" by Ueda, is not included in the illustrative polypropylene resin compositions in that reference which, as appellants point out, are used in injection molding processes. On this record, we are of the opinion that even if one of ordinary skill in the art would have been motivated to use the processing steps of Takashi with the illustrative compositions of Ueda to prepare a polypropylene synthetic paper, this person would have modified the compositions of Ueda to contain the filler of Takashi in order to take advantage of the processing steps and obtain the synthetic paper properties taught by Takashi. This would have resulted in the same polypropylene resin compositions taught by Takashi, as this person would have further reasonably selected a polypropylene resin such as that disclosed in Takashi to produce a synthetic paper with the properties taught by the reference, and Ueda does not limit the properties of the thermoplastic resins, including the polypropylene resins, which can be used with the class of polyetheresteramides and the polyamides and modified low-molecular weight polypropylenes.

In this respect, as the examiner argues, Ueda provides both the particular polyetheresteramides permanent antistatic agents and the associated facilitating compounds to make the agents effective in polypropylene compositions as well as the motivation to use these compounds in polypropylene compositions in which a permanent antistatic property is desired, such as the polypropylene compositions used to prepared synthetic paper in Takashi as acknowledged by appellants in their specification. *See, e.g., Skoll*, 523 F.2d at 1397, 187 USPQ at 484. We recognize that Ueda would have taught preferred amounts of the polyetheresteramide antistatic agent as a weight percent of the resin components while Takashi would have taught the amount of different antistatic agents as a weight percent of the resin components *and* the fine inorganic particulate filler. However, on this record, we find that when the amount of antistatic agent taught by Takashi is considered based on the resin composition alone, the actual amounts of antistatic agent used relative to the amount of resin components is not significantly different.



Thus, we determine that one of ordinary skill in this art would have adjusted the amount of polyetheresteramide used in the polypropylene resin compositions of Takashi based on the teachings of Ueda to determine workable and optimum ranges to obtain the desired antistatic properties and thus, the paper handling and offset printing properties of the resulting polypropylene synthetic paper desired in the art. *Aller*, 220 F.2d at 456-58, 105 USPQ at 235-37.

Accordingly, we are of the opinion that the closest prior art is Takashi and the combination of this reference with Ohba and Ueda is sufficient to establish the *prima facie* obviousness of the claimed polypropylene synthetic paper encompassed by appealed claim 1 within the meaning of § 103(a), as it is not necessary that all of the features of Takashi and Ueda must be incorporated one within the other for this purpose. *See Keller*, 642 F.2d at 425, 208 USPQ at 881.

We now consider the objective evidence in the specification and in the Yamanaka declarations relied on by appellants in the brief and reply brief to establish unexpected results. In this respect, appellants have the burden to submit an explanation or evidence establishing the practical significance of such results vis-à-vis the teachings of the applied references and why the results would have been considered unexpected, which burden is not carried by mere arguments of counsel. *See generally, In re Geisler*, 116 F.3d 1465, 1470, 43 USPQ2d 1362, 1365-66 (Fed. Cir. 1997); *In re Merck*, 800 F.2d 1091, 1099, 231 USPQ 375, 381 (Fed. Cir. 1986); *In re Longi*, 759 F.2d 887, 897, 225 USPQ 645, 651-52 (Fed. Cir. 1985); *In re Lindner*, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972) (“The affidavit and specification do contain allegations that synergistic results are obtained with all the claimed compositions, but those statements are not supported by any factual evidence other than that limited amount of evidence discussed above. This court has said . . . that mere lawyers’ arguments unsupported by factual evidence are insufficient to establish unexpected results. [Citations omitted.] Likewise, mere conclusory statements in the specification and affidavits are entitled to little weight when the Patent Office questions the efficacy of those statements. [Citations omitted]”); *In re Klosak*, 455 F.2d 1077, 1080, 173 USPQ 14, 16 (CCPA 1972); *In re D’Ancicco*, 439 F.2d 1244, 1248, 169 USPQ 303, 306 (1971). Appellants can satisfy their burden of establishing patentable distinctness by directly or indirectly comparing a claimed polypropylene synthetic paper with a polypropylene synthetic

paper of Takashi which is the closest prior art, in a manner that can reasonably be considered to be a “side-by-side” comparison that addresses the thrust of the rejection. *See generally, In re Baxter Travenol Labs.*, 952 F.2d 388, 392, 21 USPQ2d 1281, 1285 (Fed. Cir. 1991) (“[W]hen unexpected results are used as evidence of nonobviousness, the results must be shown to be unexpected compared to the closest prior art. [Citation omitted.]”); *In re Burckel*, 592 F.2d 1175, 1179-80, 201 USPQ 67, 71 (CCPA 1979) (the claimed subject matter must be compared with the closest prior art in a manner which addresses the thrust of the rejection); *In re Blondel*, 499 F.2d 1311, 1317, 182 USPQ 294, 298 (CCPA 1974) (“Appellants’ brief goes through a detailed, step-by-step analysis of the evidence in support of the conclusion to be drawn from the indirect comparison . . . ,” establishing that the indirect evidence provided a reliable indication of the performance of the closest claimed and prior art compounds); *In re Dunn*, 349 F.2d 433, 439, 146 USPQ 479, 483 (CCPA 1965) (“[W]e do not feel it an unreasonable burden on appellants to require comparative examples relied on for non-obviousness to be truly comparative. The cause and effect sought to be proven is lost here in the welter of unfixed variables.”). If the reported results reasonably appear to be no more than one of ordinary skill in the art would have reasonably expected from the teachings of Takashi and Ueda, in the absence of evidence explaining the practical significance of such results and establishing that the results are unexpected, the same would be indicative of obviousness rather than nonobviousness. *See, e.g., In re Hoffmann*, 556 F.2d 539, 541, 194 USPQ 126, 128 (CCPA 1977) (reference disclosed property argued to be unexpected); *Skoll*, 523 F.2d at 1397, 187 USPQ at 484 (reference suggested the desirability of substituting reagent for that used in the process of another reference); *In re Gershon*, 372 F.2d 535, 537-39, 152 USPQ 602, 604-05 (CCPA 1967) (references teach the superiority of using a reagent for a particular purpose)..

Appellants rely on Comparative Example 1, in which the polypropylene synthetic paper contains *no* antistatic agent or any other ingredients including *filler*, and specification Comparative Examples 2 and 3, both of which contain the claimed polyetheresteramide, polyamide and modified low-molecular weight polypropylene but *lack filler* and are not corona discharge treated or uniaxially stretched, respectively, with respect to the teaching of Ueda. We are of the opinion that the examiner correctly finds that the results reported in specification Table

2 for these examples are not unexpected in view of the acknowledged use of an antistatic agent by Takashi and the requirement for such agent in the specification (page 1) with respect to the first example, and the teaching to use filler in the film and then stretch and oxidize by corona discharge treatment the film in Takashi with respect to the other two examples. Indeed, in the absence of an explanation of the practical significance of the results, we find no reasonable direct or indirect “side-by-side” comparison between these examples and the claimed specification examples which addresses the thrust of the rejection which is based on Takashi as the closest prior art and not Ueda, as we discussed above. Thus, on this record, we find little, if any, evidence that supports appellants’ argument that the comparative examples establish the “excellent” properties of the claimed synthetic papers with respect to the prior art and that they discovered the benefit of orienting the film on antistatic properties. *Lindner*, 457 F.2d 506, 508, 173 USPQ 356, 358.

We find that declarant Yamanaka states in declaration I that Experiment 1 is a duplication of Takashi Example 2 (Takashi Tables I(a) and II(a)) in which an antistatic agent in the amount of 0.3 parts was used to prepare a three layer polypropylene synthetic paper as taught in the reference, and that Experiment 2 prepares a synthetic paper “in the same manner as in Example 1, except that instead of” the antistatic agent of Experiment 1, an unnamed material “was used an antistatic agent and the incorporation of the resin component in the surface layer was effected as set forth in Table 2” (pages 2-4). We find that the sole antistatic agent described at page 2, third full paragraph, for Experiment 1 is the antistatic agent stated to be replaced at page 4, first full paragraph, and the respective antistatic agents employed are *both* described as “low-molecular weight antistatic agent” in the explanation of the results at page 4, second full paragraph. Thus, the antistatic agent of Experiment 2 is not a polyetheresteramide and, therefore, not a claimed synthetic paper as found by the examiner (answer, page 14). Furthermore, presuming that the “low-molecular weight antistatic agent” is the same in each, we further find that contrary to the testimony of declarant Yamanaka, a comparison of declaration Tables 1 and 2 makes clear that there are other significant differences between the synthetic papers of Experiments 1 and 2 with respect to the components of the resin compositions, wherein the resin composition of

Experiment 2 includes unspecified components; the fine inorganic particulate filler; the thicknesses of all three layers; and stretching ratios.

We find that while declarant Yamanaka states that the two disparate synthetic papers in these Experiments are unacceptable based on the reported data in declaration Table 2, as argued by appellants, the practical effect of the evidence with respect to the thrust of the rejection has not been explained, and, indeed, there is no direct or indirect “side-by-side” comparison of a claimed synthetic paper with one representing Takashi. Thus, at best, the evidence in the Yamanaka I declaration establishes a result expected by one of ordinary skill in this art from the kind of antistatic agents employed in Takashi as acknowledged by appellants in the specification (pages 1-2).

We find that declarant Yamanaka states in declaration II that Experiments 1 and 2 were “conducted in the same manner as in” specification Comparative Examples 1 and 2, except that in the former, “corona discharge treated was carried out as a surface treatment,” and in the latter, “corona discharge treatment[] was not carried out” (pages 1-2). Thus, as shown in declaration Table 1, the synthetic paper of Experiment 1 is uniaxially stretched and corona discharge treated, while the synthetic paper of Experiment 2 is neither stretched nor treated. We find it apparent from declaration Table 1 as we did for specification Comparative Examples 2 and 3 from specification Table 2 above, that the synthetic films of Experiments 1 and 2 both *lack filler*.

We find that in comparison to the results reported for specification Comparative Examples 1 and 2 in specification Table 2, declarant Yamanaka states that, using “X” as “poor” and “Δ” as “fair,” the corona treatment in Experiment 1 improved the stretched film of Comparative Example 2 from “poor” to “fair,” and the absence of corona treatment in Experiment 2 deteriorated the unstretched film of Comparative Example 3 from “fair” to “poor” (page 3). Appellants argue that the results establish that film from compositions disclosed by Ueda which are not corona treated have insufficient antistatic properties and the examiner finds that the comparison does not reflect the teachings of Takashi which is the closest prior art.

We find here, as we did above with respect to the specification Comparative Examples, that in the absence of an explanation of the practical significance of the results, the results as reported and explained by declarant Yamanaka are not unexpected in view of the teaching in

Takashi to use filler in the film and then stretch and oxidize it by corona discharge treatment, and, thus, as the examiner points out, there is no reasonable direct or indirect “side-by-side” comparison provided by Experiments 1 and 2 which addresses the thrust of the rejection in which Takashi, and not Ueda, is the closest prior art.

We find that declarant Yamanaka states in declaration III that Experiment 1 involves Takashi Example 12 wherein the “same composition as in Tables I(b) and II(b) and the same molding conditions as in Table III of [Takashi] were used but conditions not described in [Takashi], such as extrusion temperature, cooling temperature, etc. were replaced by those described in the present application,” and that Experiments 2 and 3 involve the “same procedures” (pages 1). Notwithstanding the few differences between these conditions and those in Takashi Table III for Takashi Example 12, there are significant basic differences between the ingredients and processing conditions used in the base and paper-like layers of the synthetic papers of Experiments 1-3 (*see* Takashi Tables I(b), II(b), III and IV, and declaration III Tables 1 and 2) and the synthetic paper of “Example 1 of the Present Application” in Experiment 4 (*see* specification pages 29-31 and Table 1, page 36, and declaration III Table 2). These include, among others, the kind and amount of “Resin” (e.g., polyamide in Takashi Experiments and polyethylene in the claimed Experiment), the kind and amount of fine inorganic particulate filler, the thicknesses of the individual layers and the stretching ratios. The base layer of Takashi Example 12 contains an antistatic agent which was omitted in declaration III Experiments 1-3, and the antistatic agent of the paper-like layer of Experiment 1 has been changed to a different type than used in Takashi Example 12 as declarant Yamanaka explains (page 2). The antistatic agent used in paper-like layers of Experiments 2 and 3 is the polyetheresteramide used in specification Example 1 but in significantly reduced amounts and without a polyamide or a modified low-molecular weight polypropylene.

Based on the results for surface resistivity reported in declaration III Table 2, declarant Yamanaka explains that the resistivity for Experiment 1 initially “was somewhat improved” but “after washing with water, . . . deteriorated,” while Experiments 2 and 3, with differing amount of the polyetheresteramide, initially were “somewhat improved” and “after washing with water, unchanged” (pages 4-5). Declarant Yamanaka concludes with respect to Experiment 3 that

“[b]ecause a large amount of polyetheresteramide was added, the polyetheresteramide was insufficiently dispersed, so that the surface resistivities of  $10^{10}$  to  $10^{11} \Omega$  as described in the examples of the present application could not be obtained” (pages 4-5). Claimed Experiment 4 was improved before washing with “clear improvement after washing” (page 5). The offset printing results are reported using the symbols “⊙,” “Δ,” and “X” as defined (page 5), that is, acceptable, poses problems in practical use and unacceptable. On this basis, the synthetic paper of Experiment 1, containing an antistatic agent disclosed by Takashi, was unacceptable as was the synthetic paper of Experiment 2, containing the same amount of polyetheresteramide, and the synthetic paper of Experiment 3, containing a greater amount of polyetheresteramide, poses problems in practical (pages 5-6). The claimed synthetic paper of Experiment 4, containing the polyetheresteramide, polyamide and modified low-molecular weight polypropylene, was acceptable (page 6). Declarant Yamanaka links the results to surface resistivity (*id.*).

We find that declarant Yamanaka has demonstrated the practical effect of the difference in surface resistivity between the synthetic papers of Experiments 1-4. However, we find no direct or indirect “side-by-side” comparison in any combination of these Experiments of a claimed synthetic paper with one representing Takashi wherein the sole difference is the kind and amount of antistatic agent. *See Dunn*, 349 F.2d at 439, 146 USPQ at 483 (“The cause and effect sought to be proven is lost here in the welter of unfixed variables.”). In this context, we fail to find evidence establishing that the results reported would have been unexpected by one of ordinary skill in this art in view of the combined teachings of Takashi and Ueda, and particularly since Ueda would have taught that the combination of polyetheresteramide, polyamide and modified low-molecular weight polypropylene are particularly effective in providing a “permanent antistatic” effect in polypropylene compositions, as the examiner points out. Indeed, as the examiner finds, the evidence establishes a result expected by one of ordinary skill in this art from the kind of antistatic agents employed in Takashi which results in high surface resistivity in synthetic papers as acknowledged by appellants in the specification. *See Hoffmann*, 556 F.2d at 541, 194 USPQ at 128; *Skoll*, 523 F.2d at 1397, 187 USPQ at 484; *Gershon*, 372 F.2d at 537-39, 152 USPQ at 604-05.



We agree with the examiner that the evidence in Experiment 5 of the Yamanaka III declaration, which is based on Ueda and thus, employs a polypropylene resin suitable for injection molding (declaration, e.g., pages 7 and 9-10), does not address the thrust of the rejection. Indeed, as we determined above, one of ordinary skill in this art would have selected a polypropylene resin suitable for preparing base and paper-like layers for synthetic papers in following the combined teachings of Takashi and Ueda, and there is no evidence in the declaration explaining the practical significance of the results reported in Experiment 5 in this context.

We find that declarant Yamanaka states in declaration IV that the three layer synthetic paper of Experiment 1 based on Takashi Example 12 is the same as that of Experiment 1 of declaration III; that the same three layer paper synthetic paper is used in Experiment 2 “except that corona discharge was omitted;” that the base layer and paper-like layer of the two layer synthetic paper of Experiment 3 are the same as the corresponding layers of Experiment 1; and that the paper-like single layer synthetic paper of Experiment 4 corresponds to the paper-like layer of Experiment 1 (pages 1-4; declaration Tables 1 and 2). Declarant Yamanaka further states that the synthetic paper of Experiment 5 is that of “Example 1 of the present application” and thus, is the same as that of Experiment 4 of declaration III; that that the base layer and paper-like layer of the two layer synthetic paper of Experiment 6 are the same as the corresponding layers of Experiment 5; and that the paper-like single layer synthetic paper of Experiment 7 corresponds to the paper-like layer of Experiment 5 (page 4; declaration Tables 1 and 2). Declarant Yamanaka still further states that the synthetic paper of Experiment 8 is the same as Experiment 1 except that the “0.7” antistatic agent of the paper-like layers of Experiment 1 is replaced with “66.7” parts of polyetheresteramide as set forth in declaration Table 1 (*id.*).

We find here, as we did with respect to declaration III above, that there are significant basic differences between the ingredients and processing conditions used in the base and paper-like layers of the synthetic paper of Experiment 1, representing Takashi Example 12, and the synthetic paper of Experiment 5, representing specification Example 1, and thus of Experiment 2-4 and Experiments 6 and 7. These include, as they did above, among others, the kind and amount of “Resin,” the kind and amount of fine inorganic particulate filler, the thicknesses of the

individual layers and the stretching ratios. Experiment 8 further contains an amount of polyetheresteramide in excess of the amount of this ingredient alone in specification Example 1, and declarant Yamanaka discloses that the amount is “40% by weight . . . based on the resin component” which amount is at the top end of the range of this ingredient specified in appealed claim 1. There is no evidence establishing the relationship between this amount and the amount of the same ingredient in specification Example 1 (specification, pages 29-30).

The results reported for surface resistivity for the synthetic papers of Experiments 1-4 (Table 2) are characterized by declarant Yamanaka as “somewhat improved” before washing, but “deteriorated” after, while that of “Experiments 5 to 7 did not change as compared with that of Example 1 of the present application” (page 5). We find that the resistivity of Experiments 5-7 is as reported in declaration III (Table 2), in which declaration, declarant Yamanaka found “a clear improvement after washing,” as we pointed out above. The surface resistivity reported for Experiment 8 was “somewhat improved” before washing, and “unchanged” thereafter, declarant Yamanaka stating that “[b]ecause a large amount of polyetheresteramide was added, polyetheresteramide was insufficiently dispersed, so that the surface resistivities of  $10^{10}$  to  $10^{11} \Omega$  as described in the Examples of the present application could not be obtained” (pages 5-6).

The offset printing results are reported using the symbols “⊙,” “Δ,” and “X” without definition (page 6 and Table 2). Declarant Yamanaka concludes that the suitability of synthetic papers of Experiments 1-4 were “X” while that “of each of Experiments 5 to 7 were similar to those of” specification Example 1, and that of Experiment 8 was “Δ” (page 6).

We agree with the examiner that the objective evidence in the Yamanaka IV declaration is not persuasive for the same reasons as the evidence in Yamanaka III declaration (*see above* p. 21). On this basis, we thus agree with the examiner’s finding that the results shown in the Yamanaka IV declaration, including that of Experiment 8, constitute evidence of results expected by one of ordinary skill in this art from the kind of antistatic agents employed in Takashi as acknowledged by appellants in the specification.

Turning now to appellants’ arguments with respect to claims 30 through 34, 38 and 46 through 49 (brief, pages 17-18), we agree with the examiner’s findings in these respects (answer, pages 17-18), to which we add the following. We find no specified limitation with respect to




“cracks on the surface of the stretched film” (brief, page 17; original evidence deleted) in appealed claims 30 and 31; the requirement for the stretched film having “ultrafine cracks on a surface” appearing in claim 28, which issue we have considered (*see above* pp. 6 and 14).


Accordingly, based on our consideration of the totality of the record before us, we have weighed the evidence of obviousness found in the combined teachings of Takashi, Ohba and Ueda with appellants’ countervailing evidence of and argument for nonobviousness and conclude that the claimed invention encompassed by appealed claims 1 and 28 through 49 would have been obvious as a matter of law under 35 U.S.C. § 103(a).


The examiner’s decision is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv) (2005).

*AFFIRMED*

  
EDWARD C. KIMLIN  
Administrative Patent Judge

  
BRADLEY R. GARRIS  
Administrative Patent Judge

  
CHARLES F. WARREN  
Administrative Patent Judge

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